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PROCEEDINGS

OF THE

ASSOCIATION FOR THE ADVANCEMENT

OF

PHYSICAL EDUCATION,

AT ITS

ORGANIZATION AT BROOKLYN, N. Y.,

NOVEMBER 27, 1885.

BROOKLYN:
ROME BROTHERS, STEAM PRINTERS, 377 FULTON STREET.
1885.

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ORGANIZATION.

In response to invitations from William G. Anderson, M.D., of the Adelphi Academy, about sixty representatives of various educational institutions and friends of Physical Culture assembled at Adelphi Academy, Brooklyn, N.Y , Nov. 27, 1885, at 10 o'clock.

Albert C. Perkins, Ph.D., the Principal, called the meeting to order, and cordially welcomed his guests as colaborers in a department of service of the highest importance. Physical Education, he said, was vitally related to the intellectual and moral well-being of society. He congratulated them on the progress made since he entered college thirty years ago, and expressed the belief that this gathering would give a wide impulse to a cause which was now commanding the attention and enlisting the sympathies of all intelligent men.

Professor Edward Hitchcock, M.D., of Amherst College, was then introduced as Chairman. He simply remarked that the work before us was that of fraternal conference, and that perhaps a permanent organization might be the outcome of it. He suggested the choice of a temporary secretary, and Mr Henry S. Anderson was chosen. The roll was then read and completed.

A motion was offered that a committee on Permanent Organization be appointed to consider the advisability of forming an Association, and if such be regarded feasible, to report a plan of operations.

Carried. The chair appointed the following :—

William G. Anderson, M.D. of the Adelphi Academy.
Rev. E. P. Thwing, Ph.D., President N. Y. Academy of Anthropology.
J W. Seaver, M.D., Yale College, New Haven, Conn.
Miss C. C. Ladd, Bryn Mawr College, Pa.
C. M. McIntire, Jr., M.D., Easton, Pa.

This report was made the first business of the afternoon session. The list of topics was read by the Secretary.

1. Methods of Teaching.
2. What is the best system of Measurements ?
3. German, English and American systems compared.
4. Normal Classes.
5. Manufacture of Apparatus.
6. A Permanent Organization.

The first theme was taken up, and voluntary remarks were requested.

Rev. Dr. Thwing said : Physical Education has a literature. Its history is an engaging feature. This study is related to Pulpit and Forensic Oratory, to Plastic Anatomy, to Music, to Histrionic and Mimetic Art ; to Sanitary Science, Anthropology and so to Ethics. For these reasons it deserves a thorough, scholarly consideration. The Greeks saw in one's gait a key to character. His "*walk* and conversation" or life, had more than an accidental connection. I was reading Plato this morning. He says that a good soul improves the body, and that he is but a polished clown who takes no interest in gymnastics. Pythagoras, the philosopher, Sophocles and Æschylus the poets, Epaminondas the chieftain, were graceful athletic performers. Roscius, an actor in Cicero's day, had an income of $32,000. In modern times Rothstein in Germany, Ling of Sweden, Delsarte of France, and Guttman, Lewis and others of this country have shown the fruitfulness of this science. We may approach the study of Physical Education from many points ; that of the drill master, the artist, actor, the athlete, the musician, the physician, or the psychologist. The utterances of representative men here to-day deserve a permanent record for the perusal of those who are not present. Many years of experience in college and seminary instruction have deepened my conviction of the vital importance of the themes we are now to discuss.

Dr. J. W. Seaver of Yale College, said, in substance : My method is both didactic and practical. The lectures are informal and illustrative ; the drill is made prominent. Attendance three evenings a week is required. Scientific and academic departments are represented. Personal defects in gait, posture and motion are pointed out. From club swinging and other simple exercises the pupil is judiciously advanced to more laborious work. No serious accident has ever occurred. The relation of physical to mental development is continuously insisted upon.

The Chairman, as a Nestor among us, was called upon. He remarked, that he had no pet plan, no ideal method. However, during the twenty five years he had been at Amherst, he had diligently tabulated statistics. He advised a medical examination of each student on entrance, as to his physical condition, his defects or aptitudes, and a strict, systematic training. Yet military precision cannot be insisted on. He then offered to the Association printed circulars showing the average results of physical measurements and tests of students whose height ranged from 1.76 metre to 1.77 ; the standard of comparison used having been established from 628 measurements. Another table was based upon the examination of 7,988 persons. The weight, height, girth, lung capacity, pilosity and strength are specified. Dr. H. was wont to consider each case separately ; to prescribe and proscribe as necessary ; to enjoin hygienic obedience and to forbid injurious indulgences.

WILLIAM BLAIKIE, ESQ. of the New York bar followed. He extolled this method of individual supervision as a vital co-efficient, whether in the college or primary school. The time is come for a broad basis to be laid for the study, which shall combine all elements of demonstrated success. How shall we make it less a drudgery? Dio Lewis once distributed beans bags to Bostonians, and so interested them in exercise. May we not make this discipline more alluring? In Massachusetts High Schools 31 studies are prescribed. Is any one of them so important as that of bodily exercise? Any judicious system is valuable. I am not a champion of any one method. He closed with reference to Gladstone's well preserved health.

PROF. CHAS. L. BRISTOL of Poughkeepsie, referred to his recent observation of English students on the cricket field. England apappears to me, he said, to be monumental. The people are proud of their country and proud of us. Politically they seem rapidly tending to a strongly centralized government. Eduationally they are, I think, ahead of us.

DR. SARGENT of Harvard College asked, whom are we to teach? where are we to teach? what are we to teach? A college is not a Y.M.C.A. Local conditions must modify. Economy of time is to be sought in each case. Medical examination is desirable. Generous pecuniary support should be guaranteed to this department.

DR. W. L. SAVAGE of St. Peter's Hospital, Brooklyn, spoke of ill ventilated school houses and weary children, and of the relief which open windows and physical exercise even for sixty seconds would bring to the pupils.

PROF. H. C. BARRETT of Philadelphia, urged that the same personal supervision of students be had that physicians have of their patients.

Mr. **T. J. TURNER** of Princeton, N.J., spoke of the adaptation of weights to varying muscular strength.

DR. ANDERSON gave an account of the Adelphi daily drill with music. Fifty per cent. of my success is due to the pianist. Wands, bar bells and sword exercise with wooden rods are used. Reports to parents are given. Our anthropometic tables are printed in the September *Adelphian.* We stimulate a noble ambition and point, for example, to the conspicuous beauty of well developed biceps, when one is seen in a bathing dress.

Prof. Koehler of West Point, said that his method was a modified Swiss method. The drill master takes the applicants after the physician's examination. The men are then put into the gymnasium. Exercises are taken with military precision.

Lieut. Kirby then gave a series of physical exercises to illustrate the method he uses in drilling West Point cadets. He pleaded for more generous appropriations for this department. He was loudly applauded.

Adjourned for lunch until 1.30 P.M.

AFTERNOON SESSION.

Rev. Dr. Thwing reported in behalf of the Committee that a Permanent Organization seemed desirable, and suggested the following:

PLAN OF ORGANIZATION.

Name and Object.—This body shall be called The Association for the Advancement of Physical Education.

Membership.—The payment of one dollar shall secure membership.

Meetings.—An annual meeting shall be held on the day following our National Thanksgiving, unless otherwise ordered by the Council.

Officers.—There shall be a President, three Vice-Presidents, a Secretary and a Treasurer chosen annually. These six with three other members shall constitute the Council to whom the general affairs of the Association shall be intrusted.

The Council shall have authority to fill vacancies in their number, which may occur between the annual sessions of the Association. They may draft a Constitution and By-Laws, if such be needed, and report the same at the next meeting.

Officers proposed:—Dr. E. Hitchcock, President; Vice-Presidents, Prof. E. L. Richards, D. A. Sargent, M.D., and Miss H. C. Putnam; Secretary, W. G. Anderson, M.D.; Treasurer, Prof. J. D. Andrews; Additional members of the Council, Prof. Koehler, Charles McIntire, Jr., M.D., and William Blaikie, Esq.

The report was unanimously adopted, and the Board of Officers declared elected.

Rev. Edward Anderson of Norwalk, Conn., urged foundation work with those in childhood, and wished that this new organization might start with vigor. He believed that a new impulse would go forth from this body, and in the near future make itself widely felt for good.

Prof. Archibald Cuthbertson of New York, read a paper on the value of a Permanent Organization, prepared by request in anticipation of such an Association as now was formed, and suggested some special points of study, which, if followed would commend its work to the public. Concentration of energy and repetition of exercises were vitally important.

Dr. Sargent said that he was about to publish the data gathered by him, which would give a detailed account of his work at Harvard. A wide basis is needed before we generalize and formulate tables and rules. We may help each other. Where, for instance, shall we measure the chest? Uniformity is needed to give value to statistics. So as to measurements of muscle, of strength and of stature. Capitalists and educators will respect aggregated influence more than the utterances of individuals and specialists. He emphasized the need of medical examination before intelligent prescription of exercise could be given. All conditions of age, sex, mental and physical development must be studied. The antagonism of this with purely intellectual training should be removed, and also the indifference to Physical Education as compared with the book-cramming process. Better lower the grade of scholarship than to lower the tone of health, but that is not necessary.

Dr. Hitchcock endorsed these ideas of a physical basis as a prime necessity. He saw a great advance in the matter of health culture during his period of service, and was hopeful as to the future.

Prof. A. T. **Deane** at 81 years of age, spoke on the advantage he had enjoyed from physical training through a long, laborious life.

On motion of Dr. Savage, a committee on Statistics and Measurements was appointed, Dr. Sargent, Dr. Hitchcock, and Dr. Anderson.

Dr. Thwing introduced the topic of "Emergency Classes" to teach persons to give immediate help to the injured. Dr. Sargent answered queries and showed the practical importance of such popular instruction.

Miss Putnam of Vassar College, spoke of the enthusiasm of her 300 students. She has class drill of 40 or 50 together. The gymnasium is but moderately equipped.

Miss Ladd of Philadelphia, briefly gave her experience.

Mr. Calvin H. Pratt expressed great satisfaction at the organization, and in behalf of the Trustees present tendered to the Association the use of the Academy for the next annual meeting.

A vote of thanks was passed for courtesies already received, and the invitation was gratefully accepted.

An invitation extended by Prof. Andrews to visit the new building of the Y.M.C.A. of this city was also accepted. The services of the Secretary of the meeting and of W. G. Anderson, M.D., who called the session were recognized by a vote of thanks.

Miss Hunt of the Adelphi, spoke of the training of the pupils under her charge, and said that the requisitions of a literary character, though high, did not crowd aside the work of health culture.

Counsellor Blaikie urged the mingling of athletic exercises with the sports of childhood. We must popularize our work amongst many who do not favor professional and competitive exercises. Let us have the simple before the elaborate, individual training aside from mere emulous rivalry. In the family and in the field, familiar hints, as to posture, carriage and other matters may prove of great value.

Secretary T. J. Wilkie of the Brooklyn Y.M.C.A., spoke of the continuous and urgent demand for trained teachers, and hence the imperative necessity of Normal Classes.

Dr. Perkins outlined his ideal teacher. He must be a gentleman in deportment, of kindly instincts, apt to teach and a graduate in medicine. He had such a man in charge of the Physical Department of the Adelphi.

Lieut. Kirby spoke of the great helpfulness his cadets had received from Prof. Koehler's calisthenic drill. The latter then gave a brief account of the model German gymnasium at Milwaukee. Instruction begins early. Music and song books are used by the children. Evening lectures are given to older ones, fitting for the teacher's profession. Specialists are not encouraged, or training for mere notoriety in sensational or spectacular exercises.

The Council gave notice of a meeting for business immediately after adjournment.

The Association adjourned at 3.45 p.m. to meet in the same place on the last Friday in November, 1886.

HENRY S. ANDERSON,
Temporary Secretary.

Nota Bene.—Prof. Richards having declined his appointment, on account of pressure of duties, the vacancy has been filled by the appointment by the council of Rev. Dr. Thwing, to whom the undersigned desires to acknowledge his indebtedness for the condensed report of the foregoing addresses, and for his supervision of the printing of the same.

W. G. ANDERSON, M.D.,
Secretary of the Association.

PROCEEDINGS

II 5949

OF THE

AMERICAN ASSOCIATION

FOR THE ADVANCEMENT OF

PHYSICAL EDUCATION,

AT ITS

SECOND ANNUAL MEETING AT BROOKLYN, N.Y.,

NOVEMBER 26, 1886.

BROOKLYN:
ROME BROTHERS, STEAM PRINTERS, 377 FULTON STREET.
1886.

Brooklyn Normal School

FOR PHYSICAL TRAINING.

SECOND ANNUAL ANNOUNCEMENT.

The subject of Physical Education is, at the present time, receiving unusual attention. Intelligent people are looking upon it as a department of instruction that should have full rank in schools and colleges.

Our best colleges are introducing systematic physical exercises as a part of the regular curriculum, and are spending money freely upon buildings devoted to this purpose. Their example is being widely followed by other institutions of learning throughout the country, and as a result there is a demand for educated men and woman to act as teachers.

It is essential that the training should be carefully graded and pursued upon a regular system; and it is of vital importance that children and growing boys and girls come in contact, in the gymnasium, with teachers who are as refined and competent to teach, as instructors in other branches.

In order to prepare teachers for the new work, THE BROOKLYN NORMAL SCHOOL FOR PHYSICAL EDUCATION has been established.

Advantages offered by this School.

1. No school in the country pays more attention to the Physical Education of its scholars than the Adelphi Academy. The number of scholars enrolled is within a few of 1,000, the majority of whom take daily exercise (obligatory). Members of the Normal Class will have opportunity to super-observe and assist in the instruction of these classes.
2. There are lectures and studies on the following subjects:—Anatomy, Physiology, Hygiene, Anthropometry, Gymnastics, Public and Personal Health, Military Methods, Treatment of Diseases and Deformity by Exercise and Manipulation, Influence of Mind upon Body.
3. Instruction is given in Vocal Culture, Delsarte system, Music, Fencing, Rowing, Boxing, games and athletic sports, manufacture of apparatus and appliances.
4. Members will have the opportunity of conducting classes, assisting in fitting up gymnasiums and manufacturing apparatus.
5. A series of lectures by men and women prominent in the profession will be given each term.
6. The Normal Class instructors supervise the Physical Training of over 3,000 scholars, thus presenting a magnificent field for examination and diagnosis.
7. The Faculty consists of Twelve Lecturers and Instructors.
8. There is a Fall and Winter course of eight months, and a Summer course at Chautauqua, N.Y., of two months.

The Advisory Board consists of the following gentlemen: Prof. EDWARD HITCHCOCK, M.D., Professor Physical Culture, Amherst College; A. C. PERKINS, Ph.D., Principal Adelphi Academy, Brooklyn; TRUMAN J. BACKUS, LL.D., Principal Packer Institute, Brooklyn; Rev. E. P. THWING, M.D., Ph.D., President N.Y. Academy of Anthropology; CALVIN PATTERSON, Superintendent Public Instruction, Brooklyn; J. C. HUTCHISON, M.D., LL.D., Brooklyn; WILLIAM BLAIKIE, Esq., New York; Rev. T. DE WITT TALMAG D. D., Brooklyn, N.Y.; Rev. E. F. SEE, Brooklyn Y.M.C.A.

For Catalogue and further particulars, address:

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President Brooklyn Normal School for Physical Training,
40 CLIFTON PLACE, BROOKLYN, N.Y.

PROCEEDINGS

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FOR THE ADVANCEMENT OF

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1886.

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Prof. D. A. Sargent

CONSTITUTION.

ARTICLE I.—NAME.

This body shall be called the "AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF PHYSICAL EDUCATION."

ARTICLE II.—OBJECTS.

The objects of the Association shall be to disseminate knowledge concerning physical education. to improve the methods, and by meetings of the members to bring those interested in the subject into closer relation to each other.

ARTICLE III.—MEMBERSHIP.

SEC. 1.--The Membership shall consist of Active, Associate and Honorary members.

SEC. 2.—Active membership shall be restricted to those directly engaged in Physical Education.

SEC. 3.—Associate Members shall include all who are interested in the cause of Physical Education, and desire to be associated with the Society.

SEC. 4.—Honorary Members shall not exceed the proportion of one to twenty-five Active Members, and shall consist of persons well known as patrons of Physical Education. They shall be nominated by the Council and require a two-thirds vote of the members present to elect.

SEC. 5.—Active and Associate Members shall pay the same dues and be entitled to the same privileges, except that the President, Secretary, and at least three other members of the Council shall be chosen from the Active Members.

SEC. 6.—Active and Associate Members shall be proposed in open meeting of the Society, and be elected by a two-thirds vote of the members present. The Council shall determine to which class each member belongs.

ARTICLE IV.—OFFICERS.

The Officers of this Association shall consist of a President, three Vice-Presidents, a Secretary, a Treasurer, who, with three additional members, shall constitute the Council.

ARTICLE V.—MEETINGS.

The Meetings shall be held on the day following the National Thanksgiving. The Council, however, can change the time or call Special Meetings.

ARTICLE VI.—REVENUE.

SEC. 1.—One dollar shall be due at the Annual Meeting from each Active and Associate Member.

SEC. 2.—Any member neglecting to pay his annual dues for two successive years shall forfeit his membership.

ARTICLE VII.—QUORUM.

Fifteen members shall constitute a quorum to do business.

ARTICLE VIII.—AMENDMENTS.

All alterations or amendments to the Constitution must be presented in writing, lie over for one meeting, be advertised in the notice of that meeting, then adopted by a two-thirds vote of the members present.

BY-LAWS.

1.—The President shall preside at the meetings of the Association and Council, and deliver an address at the Annual Meeting.

2.—In the absence of the President the Senior Vice-President shall preside.

3.—The Secretary shall perform the duties usual to his office. His travelling expenses to and from the place of Annual Meeting shall be defrayed by the Society.

4.—The Treasurer, as custodian of the Association funds, shall not pay out any money except on vote of Council, certified to by the Secretary and endorsed by the presiding officer. He shall render a report at the Annual Meeting, when the books shall be audited by a special committee.

5.—The Council shall exercise a general oversight over the affairs of the Association ; arrange programme for the Meetings, and control the expenditures of the Association. They shall make rules for their own government.

6.—All papers read before the Association shall be the property of the author of the paper, to be published where he chooses, but he shall give the Council the privilege of publishing it in the Transactions of the Society if they so desire.

7.—Amendments to the By-Laws shall receive the unanimous consent of the members present, or take the same course as amendments to the Constitution.

PROCEEDINGS.

The Second Annual Meeting of the Association for the Advancement of Physical Culture was held at the Adelphi Academy, Brooklyn, N.Y., on November 26, 1886.

President Hitchcock called the meeting to order at 10.30 A.M., and Rev. E. Braislin, D.D., offered prayer. Mr. Charles Pratt in behalf of the Trustees of the Academy spoke as follows:

I am glad to extend you a cordial welcome on this the first anniversary of the Association. Another year of experience has passed, and we are here to give each other the benefit of that experience.

For myself, the problem of human happiness in our great cities, and how to promote the welfare of the largest number, has had very much of my thoughts. Is it not part of the work of this Association, to educate the people to appreciate the means of health which are within the reach of every one? The costly gymnasium and athletic sports are not indispensable to the citizens of Brooklyn and New York, so long as our beautiful Bridge is so near, one of the finest promenades in the world. We have in these two cities between six and ten thousand teachers, the majority of them females. Would it not be a good thing if they could be induced, or coerced, if necessary, to walk the bridge both ways every day! Among other things, another subject worthy your consideration is the formulating of plans for work which will, in some measure, lead the masses of our great cities to a more perfect knowledge of the causes which undermine health. Might not a pledge be drawn up, and signed by every one old enough to understand it, binding each to observe the laws of health, and to lead others to do the same? This might be amplified; and a few of the most startling causes for the loss of health might be enumerated. The pledge might not specifically forbid rum, opium or tobacco, nor bind the signer to any definite amount of exercise, or to a daily bath, or to stated hours of sleep, yet it might be made an influence for good.

Let us, at least, be examples of what physical education has done for us. How few realize the power of firm health! Pardon a personal experience. Many years ago I had a large business, and was under very heavy financial obligations, with no partner. The responsibility was upon me alone, and the circumstances were trying. My success seemed largely to depend upon my physical power to endure the strain. If my bodily health failed I would lose the position I had worked so hard to gain. It was only by a vigilant watch of everything which tended to weaken the body that I was enabled to retain my courage and health and alone successfully meet the varied and unintermittent cares of an extensive business.

The strenuous life of our great cities is a constant temptation to overdo. Cannot this Association suggest some means of leading our earnest professional men to see that often more and better work can be done in five hours a day, than in ten or fifteen, which they are often giving to it?

We cannot measure the possibilities of the work which has been started by this Association. I trust that the exercises to-day will awaken a new inspiration, and a firmer faith, and courage for the work of the second year. I am sure that they will all tend, not only to more firmly establish the Association now formed, but also to the general advancement of Physical Education, wherever its influence is felt.

Minutes of the session of 1885 read and adopted. The Treasurer reported $34 received from 34 members, and $31.80 paid out for printing, postage and stationery, leaving a balance of $2.20 in the treasury. Adopted.

The new Constitution was read and adopted.

After the election of new members, the President read a paper on Anthropometric Measurements, which was ordered to be printed with another on the same subject presented by Dr. SARGENT of the Committee on Statistics.

The following officers were elected for the ensuing year: President, Prof. E HITCHCOCK, M.D.; Vice-Presidents, Prof. E. P. THWING, M.D., Ph.D., D. A. SARGENT, M.D., and Miss H. C. PUTNAM; Secretary, W. G. ANDERSON, M.D.; Treasurer, E. M. HARTWELL, M.D., Ph.D. To complete the Council: A. M. STARKLOFF, M.D., CHARLES McINTIRE, Jr., M.D., and WILLIAM BLAIKIE, Esq.

Dr. HARTWELL read a paper on "The Physiology of Exercise." The Association then adjourned for lunch.

AFTERNOON SESSION.

Dr. **Thwing**, senior Vice-President, called the Association to order at 2.30 P.M. Prof. A. **Cuthbertson** read a paper on Physical Education, dwelling at length on the hygienic and dietary principles involved ; the evils of stimulants, drugs, tobacco and other poisons ; the need of properly graduated exercise and seasonable sleep.

The President took the chair, and Prof. W. C. **Joslin** read a paper on the "Physical Training of Children," an abstract of which appears elsewhere.

Prof. **Carl Betz** read another on "Educational Gymnastics," and C. J. **Rathman**, Esq., on the "German System of training teachers at the Milwaukee Normal School."

The final paper was read by A. M. **Starkloff**, M.D., on "Physical Training from a Medical Standpoint." The number and length of the papers forbade any discussion.

The floor of the Academy was then cleared, and an exhibition of German and American systems of training was given by students of the Adelphi and of the Normal Class ; by twenty-three lads and forty girls from the Turn Hall, Fourth st., New York city, under Director **Metzner** ; and by sixteen men from the Eastern District Turn Hall, all of which evolutions were received with deserved applause. It was then voted that the hearty thanks of the Association be presented to these various organizations for the elaborate and successful exhibition so kindly furnished.

Prof. **Brosius**' paper was read by title, owing to the lateness of the hour, and referred with other papers to the Council, with discretion as to printing.

The invitation of Mr. **Charles Pratt** in behalf of the Trustees to meet again in 1887 at the Adelphi Academy was accepted with thanks.

Adjourned at 6.30 P.M.

W. G. **Anderson**, M.D., *Secretary*.

ANTHROPOMETIC MEASUREMENTS.

Dr. Sargent reported the following method of taking measurements.

Number.—In order to secure privacy the individual should be entered in the record book by number. As a means of identification the number can be entered in an alphabetical index book opposite the corresponding name, as :

Smith, John H., 526.

For further convenience it is advisable to enter the name in a numerical index book opposite the corresponding number, as :

526, John H. Smith.

Date.—Record the year, month, day and hour, as : Jan., '86, 12, 9 A.M. Where perfect accuracy is desired, note should be made of the time that has elapsed since eating, the occupation of previous hours, and of the temperature of the room.

Age.—Record years and months, as : 21, 9, *i.e.*, twenty-one years and nine months.

Weight.—The weight of the body should be taken without clothes. Where this is impracticable the weight of the clothes should be deducted.

Height.—The height should be taken without shoes and with the head uncovered. The head and figure should be held easily erect, and the heels together. This position is best secured by bringing the heels, the buttocks, the spine between the shoulders and the back of the head in contact with the measuring rod.

Height of Knee.—The subject should place one foot on a box or chair of such a height that the knee is bent at a right angle. A box about 12 in. high is suitable for adults. Press a ruler upwards with a force of about one pound against the ham string tendons close to the calf of the leg. See that the ruler is held in a position at right angles to the vertical rod, and measure the height of the top of the ruler from the box.

Height Sitting.—Let the subject sit on a hard, flat surface about 12 inches high, such as afforded by a box or chair, with the head and figure easily erect so that the measuring rod will touch the body at the buttocks, between the shoulders and at the back of the head. Measure the distance from the box to the vertex.

Height of Pubes.—With the subject standing easily erect on the box or floor, measure up to the lower edge of the pubic bone.

Height of Crotch.—With the subject standing easily erect on the box or floor facing the vertical rod, press a ruler firmly against the perineum (crotch) and measure the height of the top of the ruler.

Height of Navel.—With the figure and head of the subject erect, measure the height of the centre of the cicatrix.

Height of Sternum.—With the figure and head of the subject erect, measure the height of the interclavicular notch.

Girth of Head.—This measurement should be taken around the head with the tape at the upper edge of the eye brows, over the supra orbital and occipital prominences. All girths should be made on the skin itself and at right angles to the axis of the body or limb at the point of measurement. No oblique measurements are taken.

Girth of Neck.—With the head of the subject erect, pass the tape around the neck half way between the head and body, or just below the "Adam's apple."

Girth of Chest.—Pass the tape around the chest so that it shall embrace the scapulae and cover the nipple. The arms of the subject should be held in a horizontal position while the tape is being adjusted and then allowed to hang naturally at the sides. Take the girth here before and after inflation.

Where it is desirable to test the elasticity or extreme mobility of the walls of the chest, a third measurement may be taken after the air has been forced out and the chest contracted to its greatest extent. To test the respiratory power, independent of muscular development, pass the tape around the body below the pectoral line and the inferior angles of the scapulae, so that the upper edge shall be two inches below the nipples. Take the girth here before and after inflation.

Girth of Waist.—The waist should be measured at the smallest part after a natural expiration.

Girth of Hips.—The subject should stand erect with feet together. Pass the tape around the hips above the pubes over the trochanters and the glutei muscles.

Girth of Thighs.—With the feet of the subject about six inches apart, the muscles set just enough to sustain the equilibrium of the body and the weight distributed equally to each leg, measure around the thigh just below the nates.

Girth of Knee.—With the knee of the subject straight and the weight of the body equally supported on both legs, measure over the centre of the patella.

Girth of Calf.—With the heels down and the weight of the body supported equally on both feet, the tape should be placed around the largest part of the calf.

Girth of Instep.—Measure around the instep at right angles with the top of the foot, passing a point at the bottom of the foot midway betweet the end of the great toe and back of the heel.

Girth of Upper Arm.—With the arm of subject bent hard at elbow, firmly contracting the biceps and held away from the body in a horizontal position, pass the tape around the greatest prominence. If desirable to find the girth of the upper arm when the biceps is not contracted, the arm should he held in a horizontal position and measured around the most prominent part.

Girth of Elbow.—Taken around the internal condyle of the humerus while the arm of the subject is straight, with the muscles of the forearm relaxed.

Girth of Forearm.—Taken around the largest part. The fist should be firmly clinched and the palm of the hand turned upward.

Girth of Wrist.—With the hand of the subject open and the muscles of the forearm relaxed, measure between the styloid process and the hand.

Breadth of Head.—The breadth of head should be taken at the broadest part. In taking the breadth measurements, stand behind the subject.

Breadth of Neck.—Taken at the narrowest part with the head of the subject erect and the muscles of the neck relaxed.

Breadth of Shoulders.—With the subject standing in a natural position, elbows at the sides, shoulders neither dropped forward nor braced backward, measure the broadest part two inches below the acromion processes.

Breadth of Waist.—Taken at the narrowest part.

Breadth of Hips.—Measure the widest part over the trochanters, while the subject stands with feet together, the weight resting equally on both legs.

Breadth of Nipples.—Taken from centre to centre with the chest in a natural position.

Depth of Chest.—Taken after a natural inspiration. Place one foot of the calipers on the sternum midway between the nipples, and the other foot on the spine at such a point that the line of measurement is at right angles with the axis of the spinal column. When it is desirable to ascertain the extent of the antero-posterior movemement of the chest, measurements may be taken from the same points after the fullest inspiration and after the fullest expiration.

DEPTH OF ABDOMEN.—Place one foot of the calipers immediately above the navel, the other on the spine at such a point that the line of measurement is at right angles to the axis of the spinal column.

LENGTH OF SHOULDER TO ELBOW.—With the arm of the subject bent sharply at the elbow and held at the side, measure from the top of the acromion process to the olecranon. Care should be taken that the measuring rod is parallel with the humerus and not with the external surface of the arm.

LENGTH FROM ELBOW TO FINGER TIP.—With the arm of the subject bent sharply at the elbow and the rod resting on back of arm and hand, measure from the olecranon process to the tip of the middle finger.

LENGTH OF FOOT.—Take the extreme length of foot from the end of the first or second toe to the back of the heel, about one inch from the surface upon which the foot rests.

STRETCH OF ARMS.—With the arms of subject stretched out horizontally so that both hands and shoulders are in a line, with one middle finger and the zero end of the measuring rod pressed against the wall, note the point to which the other middle finger tip reaches.

HORIZONTAL LENGTH.—With the heels of the subject pressed hard against a perpendicular wall, with arms at the sides and body resting naturally on a horizontal plane, measure the distance of the apex of the head from the wall

CAPACITY OF LUNGS.—The subject after loosening the clothing about the chest and taking a full inspiration, filling the lungs to their utmost capacity, should blow slowly into the spirometer. Two or three trials may be allowed.

EXPIRATORY STRENGTH.—As before, the subject after loosening the clothing about the chest and filling the lungs completely, should blow with one blast into the manometer. Care should be taken that no air is allowed to escape at the sides of the mouth, and that in expelling the air all the muscles of expiration are brought into play.

STRENGTH OF BACK.—The subject, standing upon the iron foot-rest with the dynamometer so arranged that when grasping the handles with both hands his body will be inclined forward at an angle of 60°, should take a full breath and, without bending the knees, give one hard lift, mostly with the back.

STRENGTH OF LEGS.—The subject while standing on the foot-rest with body and head erect, and chest thrown forward, should sink down, by bending the knees, until the handle grasped rests against the thighs, then taking a full breath, he should lift hard principally with the legs, using the hands to hold the handle in place.

STRENGTH OF CHEST.—The subject with his elbows extended at the sides until the forearms are on the same horizontal plane and holding the dynamometer so that the dial will face outward and the indicator point upward, should take a full breath and push vigorously against the handles, allowing the back of the instrument to press on the chest.

STRENGTH OF UPPER ARMS, TRICEPS.—The subject, while holding the position of rest upon the parallel bars, supporting his weight with arms straight, should let the body down until the chin is level with the bars, and then push it up again until the arms are fully extended. Note the number of times that he can lift himself in this manner.

STRENGTH OF UPPER ARMS, BICEPS.—The subject should grasp a horizontal bar or pair of rings and hang with the feet clear from the floor while the arms are extended. Note the number of times that he can haul his body up until his chin touches the bar or ring.

STRENGTH OF FOREARMS.—The subject, while holding the dynamometer so that the dial is turned inward, should squeeze the spring as hard as possible, first with the right hand then with the left. The strength of the muscles between the shoulders may be tested with the same instrument. The subject, while holding the dynamometer on a level with the chest, should grasp it with handles and pull with both arms from the centre outward.

PILOSITY.—Note the amount of hair on the body and limbs, excluding the head, face and pubes.

COLOR OF HAIR.—*Light* (Very Fair, Fair, Light Brown, Brown.) *Dark* (Dark Brown, Black Brown, Black). *Red* (Red Brown, Red, Golden).

COLOR OF EYES.—*Light* (Dark Blue, Blue, Light Blue). *Dark* (Light Brown, Brown, Dark Brown, Black). *Mixed* (Gray, Green).

DIRECTIONS FOR TESTING THE REFRACTIVE CONDITION OF THE EYE.

Procure of any optician two pairs of spectacles, one with convex glasses, No. .75. Dioptic (equal to No. 48 in the old or English system), and the other with concave glasses, No. .75 Dioptic. Also obtain a copy of Monoyer's test letters (a card of Dr. Dennett's modification of Monoyer's test type may be procured of Meyrowitz Bros., opticians, 295 and 297 Fourth Ave., New York City), to be hung up at 5 meters distance, and a copy of Green's astigmatic lines, in the form of a clock face, to be hung up at the same distance.

Test :—Seat the subject at a distance of five meters from the test cards, which should be hung in a good light. Examine each eye separately, keeping the other covered by a card or small book held in front of, but not touching it. Never press the fingers against the closed lid.

There are ten lines of letters on the test card, numbered from .1, .2, .3, etc., up to ten 10ths or 1. If now the subject can read the top line, the smallest letters on the card, with the right eye (R.E.) alone, his vision (V.) is recorded as ten 10ths or 1 (V.R.E. =1). If he sees nothing clearly above the fifth line from the bottom, but can read that correctly, then V.R.E.=.5. If he cannot read any of the lines, then V.R.E.=0 (*i.e.*, less than one-10th). Whatever the vision without glasses may prove to be, *always next* put on the *convex* spectacles and again cover the other eye. If now he can still with the right eye see as well or better than with no glasses at all, and can read the same line as before, he is Hypermetropic (H.) in that eye. For example, if without glasses it was found that V.R.E.=.5, and now after adding the convex glass his V. is improved to .8, the record would be V.R.E. =.5, H.=.8. But if the vision is neither improved nor made worse by the convex glass, the record will be thus : V.R.E.=.5, H.=.5. If the convex glass can be used at all without decreasing the vision, no further testing with this card is needed ; the subject is hypermetropic in that eye.

If it is found that the vision of the right eye equals 1 without glasses, and then the addition of the convex glasses blurs the letters, the eye is Emmetropic, that is, the vision is normal (V.R.E. =1).

If, however, the vision without glasses is less than 1, for instance only .3, and the convex glasses make even that line more indistinct, then put on the *concave* glasses. If now the vision is improved so that a higher line can be read, for instance the eighth from the bottom, the eye is Myopic or "near sighted" and the record will be V.R.E.=.3, My.=.8. Or again, if the vision without glasses in the left eye is found to be .7 and then with the concave glass the top line can be read, the record will stand thus: V.L.E.=.7, My.= 1. After testing each eye separately, place the record of one above the other, for example thus:

V.R E.=1,
V.L.E.=.6,
My.=.9.

This completes the testing for simple hypermetropia, myopia and emmetropia.

After testing the eyes as above, if the vision has not yet been made perfect in either, leave on the proper correcting glass the convex if there is hymetropia, or the concave if there is myopia, or use no glass if there is neither; then direct the subject's attention with that eye alone, the other being covered, to the card of radiating black lines If he sees one or more of the lines running in any direction clearer or blacker than those at right angles to them, he is shown to be astigmatic. Either the perpendicular or the horizontal lines usually appear the blacker to the astigmatic person. If the previous record was V.R.E.=.7 and this defect is found, then it will be V.R.E.=.7, As. Or if before it read: V.L.E.=.3, My.=.6. and astigmatism is found, it will read, V.L.E.=.3, My.= 6, As. Astigmatism may exist either alone or in combination with My. or H. If alone we might have a record thus: V.R.E.=.6, As.; V.L.E.=.4, As., or if with hypermetropia thus: V.R.E.=.7, H.=.7, As.; V.L.E.= 6, H.=.8, As.

To recapitulate, in brief: if it is found that V.R.E.=1, then the R E. is either Emmetropic or Hypermetropic. If emmetropic, the convex glass will markedly impair the vision; if hypermetropic it will not. If the V.R.E.=.9 or less, then the R.E. is either hypermetropic, myopic, astigmatic or amblyopic.

1st. If it is H. the convex glass will not greatly impair the vision.

2nd. If it is My. the concave glass will improve V.

3rd. If it is As. one of the radiating lines is blackest.

4th. If neither of these defects exists and the V. is less than .7 then Amblyopia or partial blindness may be recorded. It may read thus: V.L.E.=.6, Am.

Caution.—Always try the *convex* glass. *Never* try the *concave* unless the convex glass blurs the vision.

In the following cases the subject should be recommended to consult an oculist concerning the advisability of wearing glasses: If the vision without any glasses is less than .4 in either or both eyes; if he complains of weak, watery or painful eyes, especially in reading, and any degree of hypermetropia or astigmatism is found to exist.

DIRECTIONS FOR TESTING THE COLOR SENSE.

A set of selected test worsteds of different colors may be procured for about a dollar. Among these will be found three large test skeins colored light green, purple (pink or rose), and bright red. To make the examination, spread all the worsteds out on a white cloth placed upon a table. First lay the *green* test skein a little to one side of the others, and then tell the subject to throw out of the pile and lay along side of the test skein all the lighter and darker shades of that color, or all the skeins containing a shade of that color in any degree. Avoid naming the color "green" to him. If he throws out only shades of green or light blues his color sense is normal (C.S.N.) and the test is completed. But if in addition he throws out light grays, or any other shade of gray, or light yellows, salmons, or pinks, he is color-blind. If he handles or fumbles over those shades a good deal and hesitates, as if in doubt about them but yet does not throw them out, he probably has "feeble color sense" (C.S F.). The examiner in these cases must use his judgment in making a certain amount of allowance for the stupidity of some persons in understanding what is wanted, especially in the young and uneducated.

If the subject is found to be color-blind, next lay down the purple or rose colored test skein, in place of the green, in order to determine the nature of the defect. Now tell him to throw out all the different shades of that color. If he only throws out pinks and light reds and shades approaching these he is only partly color-blind. (P.C.B.) But if he throws out decidedly bluish purples, blues, violets, greens, or grays, he is completely color-blind. (C.C.B) Completely red blind if he throws out the blues, violets, etc., or green blind if the grays or greens.

No further testing is needed, but as a matter of curiosity and to prove the result, the red test skein may next be tried in the same way. If he matches with it browns or greens and grays he is completely color-blind. Dark brown or green if red blind, and light brown or green if green blind.

It is not important to record whether the complete color-blindness is red or green blindness. The following classes may be recorded :—Color sense normal=C.S.N. ; Color sense feeble=C.S.F. ; Partial color-blindness=P.C.B. ; Complete color-blindness =C.C.B.

Color-blind individuals should be warned against engaging in any occupation where this defect would prove dangerous or inconvenient.

Directions for Testing the Condition of the Ears.

Use an ordinary watch and a tuning fork, letter A. or C., as tests. Seat the subject with his right side toward you, and then while the room is perfectly quiet, see how far off he can hear the watch tick. Having previously learned by a few experiments what is the furthest distance at which the tick can be heard by normal ears, make that number of inches the denominator of a fraction, and the hearing distance of each person examined thereafter the numerator. Having found the normal distance (=H D.) to be, for instance, about sixty inches, and that of the subject now examined to be, say forty inches, his record for the right ear would then be : H.D.R.E.=$\frac{40}{60}$. If it had been $\frac{60}{60}$ or 1, the ear would be normal. $\frac{80}{60}$ would show an abnormally acute sense of hearing. If the watch could only be heard while in *contact* with his ear, it would be recorded : H.D.R.E.=$\frac{C}{60}$. If not heard at all, then H.D.R.E.=$\frac{0}{60}$. Next test the left ear in the same way. Voice sounds in talking will often be easily heard by persons quite deaf to the watch tick, so the latter is not always a reliable practical test.

Suppose we have found H.D.R.E.=$\frac{40}{60}$, H.D.L.E.= 1, this implies some deafness in the right ear, and the tuning fork will now help us to decide whether the cause lies in some defect of the auditory nerve or internal ear, or in the external or middle ear or Eustachian tube. Strike the fork against some solid substance, and then place the end of the handle against or between the subject's front teeth. If both ears are normal he will probably seem to hear the ringing of the fork equally well in both ears. But if there is a defect in one ear he will either seem to hear it louder or more feebly in the affected ear. If, as in the case we are examining, the fork is heard best in the deaf ear, this tells us that the deafness is due to some defect in the more external parts of the organ, and it can probably be corrected by appropriate treatment. But if it is heard best in the good ear, it goes to prove that the defect in the other ear is more deeply seated and cannot probably be greatly benefited by treatment. This effect of the tuning fork is contrary to what would ordinarily be expected, and it is often a matter of surprise to a deaf person to find that he hears with his teeth apparently better on the deaf side.

We may now add to our record in this case : T.F. best R.E. If it had been heard equally well in both ears we would record : T.F.= N. (or Normal). Where the defect in hearing is at all marked a specialist in ear diseases should be consulted.

Our record in a normal case might be thus : H.D R.E.= 1, H.D.L.E.= 1., T.F.= N. ; or in an abnormal case it might be thus : H.D.R.E = 1, H D.L.E.= $\frac{0}{60}$, T.F. best in R.E. This would imply that the subject was so deaf in the left ear as not to be able to hear the watch tick at all, and the fork held between the teeth could be heard best in the good ear, consequently his trouble is probably seated in the deeper structures of the ear, or in the nerve itself, and treatment would not be expected to help him greatly. The tuning fork need not be tried unless the watch tick shows some defect in hearing.

PHYSICAL TRAINING FROM A MEDICAL STANDPOINT.

A. M. Starkloff, M.D., President N. A. Turnbund, St. Louis, Mo.

Sensible of the honor of being called to address you, I do so with the belief that this association is aiming at the same ideals towards the realization of which I have given the best years of my life. The claims of physical culture are manifestly underrated in this country. In no land are the material advantages of this age of inventions so fully realized. With steam we work, with steam-like haste we live, and often in like manner, we go to destruction.

An old boiler may be repaired or replaced, but the human organism is limited in its working possibilities, and often is exhausted and worn out before its time, never to be fully restored. One vital part gives out and the whole economy is fatally weakened. Allow me, then, to signalize some of the effects of modern life on our people ; the damage wrought on young and old, mentally and physically, and to hint at certain counteracting influences.

The American race is specifically a new product. It represents a union of different races and nationalities. It also represents the modifications of climate, as well as those which result from social conditions and our exacting business life. The American race, already traceable in the first generation of parents born in this country, is distinguished by a rather spare, tall, bodily figure, particularly by an inadequate and scanty development of the thorax and the pelvis.

The chest has become elongated beyond the normal length, and all its other diameters are below the standard.

The decrease of the capacity of the thorax is owing to the scanty development of the ribs. This fact, I wish to discuss, particularly from a medical point of view. The greatest destroyer of mankind, *tuberculosis*, is not a hereditary disease, descending from parent to child, but only the disposition favorable to the development of the malady in the form of the so-called tuberculosis *habitus*, and this consists in the elongated thorax.

It is a well known fact that tuberculosis attacks mostly those extreme longitudinal points of the lungs, which are found in the elongated narrow chest.

In ordinary every day life, as it is placed before our eyes, we breathe easy, not deep, setting only the parts of the lungs next to the trachea in motion—the middle and lower lobes ; and only when we breathe heavy and deep, are we moving the lung lobes farthest from the trachea. People of a quiet, passive temperament, whose life flows calmly without excitement, one day like the other, accustom themselves in time to a light and superficial mode of breathing, so that the extreme points of the outside lobes of the lungs are never set in motion.

You all know that a broken arm, laid in plaster for some weeks, shrinks and becomes thin ; the muscles dwindle away and lose finally their contractality. The lungs also consist of muscular tissues, and if never fully inflated, their tissues will have to undergo the same process of degeneration as the arm laid in a bandage of plaster of Paris.

The air vesicles shrink, the muscle fibres degenerate, and then we have the tuberculosis ; and now, we can explain easily why particularly the elongated narrow chest in the case of the so-called hereditary tuberculosis does breed it again and again, for it is here that we find the extreme points farthest away from the trachea, than under normal conditions. Thus you see that here this terrible disease claims a multitude of victims, because the physical construction of the American race predisposes favorably its development.

Given the pathological conditions favoring the development and propagation of a disease, the possibility of confining it is also indicated. But notice a few other pathological conditions arising from causes that may also be cured by similar remedies; preeminently the diseases of the spinal column, having their origin in the irregular and unharmonious development of the young body. We find in most children a tendency to a stronger development of the right side, thereby causing an unequal burdening of the body, which in its turn tends towards bending the spinal column. If you add to this any morbid condition of the body, you have the cripple.

But these are not the only enemies of a normal development of our people against which we ought to direct our energies in the education of the youth. Traceable to the abnormal condition of our social life there is a whole army of nervous diseases: precocious maturity in children, nervousness and exhaustion in men and women ; not to forget the whole array of intestinal diseases, which manifest themselves as dyspepsia, biliousness, habitual constipation and hypochondria,—these all are caused by the unequal balancing of our physical forces and capabilities.

Comparing the education of to-day with that of the ancients, we have to confess that they were far ahead of us in the harmonious development of body and mind.

The principle "*Mens sana in corpore sano,*" was strictly observed and the æsthetic feeling of the Greek made the thought imperative, that a beautiful *Psyche* should dwell in a beautiful body. In Greece as well as in Rome, physical development was considered the basis of all personal and general welfare. Brilliant results have proved the correctness of their views. The historian is compelled to observe, that mankind in spite of the enormous progress in general civilization has retrogaded in certain respects, and above all in physical culture. We forget that the body is in need of development, as well as the mind, and so there has come to be a certain estrangement between body and soul. The mind, regardless of its companion, has soared on high into the regions of ideal life, while the temple of the mind, like a forsaken building, is left to early decadence. Is it not the aim of this Association to aid in retoring the equilibrium ?

Knowing that tuberculosis can be counteracted by the expansion of the youthful chest, through pulmonary gymnastics, and that the whole array of nervous diseases, like nervous exhaustion, over-exertion, want of digestive power, etc., can be treated with success, and even eradicated through physical culture, theoretically and practically taught; knowing also, that all physical exercises, like turning, fencing and swimming, not only strengthen the muscular system, but also stimulate the activity of the central nervous system, the brain and the spinal marrow—I say knowing all this, who would refuse to lend a helping hand to this good work?

Not only the motor nerve system but also the secretory system needs exercise, and for this the usefulness of gymnastics is even greater than for muscle. All technical accomplishments are based upon the exercise of the ganglionic cells, even if such accomplishments are possible without the expenditure of great muscular force, as for instance in highly endowed musicians, where their great abilities certainly have the origin in the central nerve system. The highest mental activity also is stimulated by exercise and energy, and is lowered by inertia. Above all, the memory may be strengthened, and every one of us in his calling, needs training for his particular chain of ideas and thoughts.

Gymnastics are, therefore, not a training of crude physical force, merely, but a harmonious developing of all the organs, with none neglected,—if the result is to be a higher degree of health, and a higher efficiency of our memory and reasoning powers.

Therefore, let us endeavor to select out of the present systems of gymnastics the best features of each, and to create a system entirely adequate to produce that *rara avis* of our modern times, a most harmoniously developed human being.

The paper of Dr. Hartwell on the "Physiology of Exercise," will be furnished by the Secretary in a separate pamphlet.

PHYSICAL TRAINING OF PUBLIC SCHOOL CHILDREN.

W. C. JOSLIN, A.M., STATEN ISLAND ACADEMY.

When I entered upon my present work at the Staten Island Academy, I found that my pupils had had, in most cases, no physical training whatever. They had developed as most boys do in a semi-urban locality, left to themselves as to exercise. They had not felt that stress of necessity which brings strength and endurance. The younger pupils were, proportionally, far stronger and sturdier than their elders. The latter, with the exception of a few base-ball enthusiasts, had found their entire exercise in sailing and in playing at tennis. The younger lads were fast following in their footsteps. All have uniformly improved, but the younger have never lost the advantage they had at the outset. In everything, save that strength which comes from mere weight, they have decidedly the better of their elders, and, at a corresponding age, beat them at all points. In acquired quickness, dexterity, ease of motion, control of the body and promptness of action, they show the incalculable advantage of beginning the physical education as soon as the mind readily comprehends the purpose, and the muscles can obediently and accurately follow the will. So long as there are parents who think it never too late for their son to "catch up," no matter at what age he commences, I will try to give other reasons why we should begin with the earliest years practicable.

1. The child is at an age when, joined to all the eagerness to excel his elder brother, he does not take his occasional questioning attitude. He is in the highest degree teachable. We all know the rapidity of progress when the pupil meets us half way.

2. The younger the pupil, the more fully he shares his daily life with his parents. Thus the latter are brought into more intimate relations with the work of the school, and are led to a deeper interest in that department of education which is doing so much for their son. That this interest may take the form of material aid in the way of room and appliances is not improbable.

3. Any one who has existed for any length of time in a house with the average boy—the boy who tiptoes on his heels and closes the doors with his back or a bang—can appreciate the solemn joy that pervades the household when the ever present terror is lifted—not by eliminating the boy, but his physical blemishes Starting with the flexible bones of the child, we give him that comparative grace which a few years later would render impossible. The clumsiness, stiffness and awkwardness gradually drop off, and the lad wonders at the ease with which he can manage what formerly were the superfluous parts of his body. Then, too, he soon learns to appreciate force and the amount of it necessary to overcome a given resistance ; hence the right impetus to the door which neither leaves it ajar nor closes it with a slam. The lad also falls into intimate yet useful relations with external objects, and finds that wisdom can come from observation and is not necessarily the child of bitter experience.

4. Since the benefit of any exercise lies in the keen zest with

which one enters into it, these exercises, which can be made as varied and interesting as any sport, combine for the pupil the attractions and benefits which he cannot find elsewhere.

5. Every graceful movement tends to make the person himself graceful. Those movements are therefore an invaluable aid which round the angles of boisterous youth, and insensibly lead to a more refined and gracious life.

6. The sicknesses to which children are exposed are vastly lessened by systematic and judicious exercise. Youth is the time to apply our "ounce of prevention." Therefore the building of the body should begin at a very early age and in connection with schools. In view of these facts it is almost incredible that not one per cent. of our schools make any adequate provision for Physical Culture. What can be the causes for this neglect?

Most of our schools have no calisthenics because there is no sentiment demanding them. The community as a whole has not the slightest idea of their benefit, and objects to anything "new fangled." Why, too, are light gymnastics such glaring failures in the majority of the schools in which they are used? Because low wages are given and poor teachers employed. As is the teacher so is the pupil. A Principal wants the credit of having calisthenics and puts it in the catalogue with the cheapest teacher, one who knows little or nothing of his work. With his fragmentary knowledge he has no confidence in his work. He does not know the causes of bodily defects. He gives to this part of his duty the little time that may be snatched from other duties. He has no system, though he may follow books. He aims at fancy work as fascinatingly pictured therein, and does not strive for results as shown in blood, brawn and uniform good health. He does not know why any particular movement is used, and why certain work must produce certain effects. The results are almost worthless. But there are teachers who are everything that these are not. There are great schools where magnificent results are attained.

We include preliminary movements to military drill, and some of its rudiments in light gymnastics; but to military drill itself as a substitute for calisthenics I have grave objections. Our aim is that harmonious development which brings health and endurance, and prepares every muscle, nerve and fibre to do its best work. We want to give to both sexes and to all ages "such physiological action to the various parts of the body under a moderate acceleration of pulse and respiration as shall impart to the nerve centres and all the organs a rapid renewal of structure and a corresponding activity of function." When it is acknowledged that military drill can be used for boys alone, and to those only who are thirteen and over, the question would seem to need no further argument. In military drill the movements are artificial, constrained and unnatural. A vast preponderance of its work is given to the legs and the right side. It is special and limited. General strength and a ready use of the body does not come from any special drill, certainly not from the handling of a musket, often three sizes too large. As true education consists, not in the acquirement of knowledge, but in the growth of mental power, so physical education comes not from acquiring a limited number of movements, but from the getting the body into that condition where it can work at its best in every line of effort. McLaren says military drill is simply adding a military application to the educational system.

I consider that the system of light gymnastics possesses that superiority to military drill which the whole of a good thing possesses over any of its parts, and which a fully trained mind possesses over one but partly disciplined and yet often prematurely forced into action. Development springs from activity alone, and this should be, so far as possible, spontaneous. The better the lad enjoys the exercise, the more good will he get out of it. Hence we diversify work in many ways and excite emulation between rooms, classes, squads and individuals. Running and walking matches, leaping, vaulting, potato races and rope pulls frequently relieve the routine. I appoint different leaders and give as much credit to zeal and attention as to the excellence of the results. With Mr. Blaikie's invaluable book for a basis, I have extended those exercises, and each day with a variety of movements bring into active service all the chief muscles of the body, alternating movements of the arms and shoulders with those of the legs, and closing with those of the waist and loins. The setting up process, deep breathings, and movements on the toes are specially valuable. When possible, I have a run at a moderate pace on the toes, with feet slightly lifted and good action of the whole body. We begin the year with a run of some twenty rods, and gradually increase it to half a mile. There is no pupil over nine who cannot run the latter distance with comparative ease, and the greater number can do the mile. These free movements for three months lead, with the younger pupils, to dumb-bells, wands and rings; with their elders, to the pulley-weights, horse, bars, and the severer work of the gymnasium proper. In their season, hare and hounds and foot ball are heartily encouraged. There can be no sight more beautiful than that of the boy or girl growing up lithe, free-limbed, erect and joyous, moving with the grace, ease and elasticity which we attribute to the young gods. Now, while much can be done with adults and pupils well in their teens, it is not possible—after the first years have gone by—to give that instruction which should have been regulated by growth itself, "beginning with its beginning, adding to, proportioning, consolidating and sustaining every cell of every fibre and tissue as it was added to the frame." The work should commence while all is plastic and movable, changing and capable of being changed. Then get the sturdy limbs, the strong and steady heart, the ample lungs, and a very little will keep them so. The momentum of this superb condition will push one safely through the stress of many a physical and mental conflict, and may carry him with vigor to the verge of a century.

GERMAN SYSTEM OF TRAINING TEACHERS AT THE MILWAUKEE NORMAL SCHOOL.

Mr. C. G. Rathmann, Educational Institution, St. Louis, Mo.

A fresh, vivifying breeze is blowing through the educational work of our country. From every direction comes the report that teachers are realizing the old truth, that they have to deal with the physical as well as the intellectual and moral nature of their pupils. Fifty years hence it will seem most strange that what was deemed by the ancients indispensable to a complete education should have waited until the nineteenth century for general recognition in our modern educational curriculum.

The unwearied efforts of those who foresaw in wholesome educational methods the surest guaranty for the stability of the republic have not been unrewarded. In many cities instruction in gymnastics has been incorporated into the work of the public schools; notably of late in those of Chicago and Kansas City, and the results in these two cities are brilliant, decisive, and convincing.

The achievements in physical education during the last decade are mainly due to the efforts of the able gymnastic teachers trained in the seminary founded and sustained by the North American Turnerbund. This Union dates its existence almost from the time that Germans first made America the goal of their wanderings from their native land, and from the beginning its societies have set before themselves as their principal task, the giving to the children of the members a thorough physical training.

About the year 1840 the department of Education in Germany added gymnastics to the regular programme of instruction in the public schools, and many emigrants thus had an opportunity of convincing themselves of the importance and advantages of this complement to the educational plan. Wherever Germans lived together in considerable numbers, turning schools were opened which were conducted by such as had attained to a degree of perfection in gymnastic work. These leaders, however, though animated by great zeal, were no pedagogues, and did not understand that gymnastics have not the single aim of developing mere brute strength. It is not the strength of the horse nor the invincible powers of the athlete, gained through extraordinary bodily exercise, that are set forth as the end to be achieved by school gymnastics. It is the purpose of this instruction, regularly arranged with exercises for each particular age and stage of progress, so as to give such a training as shall best develop health, strength, agility, and beauty.

Further, it should be the duty of the leaders of the turning schools not only to instruct but to act as apostles of gymnastics, and intelligently proclaim the advantages of physical culture by means of discussion oral and in print. The Turnerbund soon saw the need of a seminary to furnish competent teachers. In 1856 a convention held in Pittsburg discussed the question of founding a gymnastic normal school, without, however, reaching a definite result. It was not until 1866 that the Bund found itself able to call the seminary into being, and in that year a course of instruction was opened in New York. The influence of the Turnerbund is chiefly due to its favorite offspring, the N. A. Gymnastic Seminary, which arose, as it were, out of nothing, but has sent out a great number of teachers. During the past few years it led a nomadic life. It had no permanent location or building. One of the Turner halls of the city served as a lecture-room for the students. The school first began to acquire a stable character when located at Milwaukee in 1874. The institution, as directed by the Milwaukee turnverein, proved so signal a success that for the last twelve years every convention has confided the school to the care of that city.

The first course of instruction opened in New York city. There the real Turner spirit had begun to manifest itself. The beginning was modest enough. The course lasted one year, and consisted of instruction in theoretical and practical gymnastics two days a week, and once a week lectures on pedagogy, anatomy, and the first elements of surgery. Nine students were matriculated and were prepared for their profession by teachers, selected by the Bund, who received a merely nominal salary for their work. Of these nine students five were rewarded with diplomas, and several of the number are still in the service of the Bund.

In the year 1869 a second course was opened in New York, which furnished to the Bund eight additional teachers. Chicago was entrusted with the school the following year, but no fruits resulted from the work here because of the terrible fire, which also necessitated the closing of the school. The societies of Chicago suffered greatly and were unable to re-open the school the second year, and so the management was again entrusted to New York where the fourth course was opened. At this particular time there was a notable growth in the ranks of the Bund. In every portion of the United States Turner societies were established and schools were opened. Up to this date the number of trained teachers was not equal to the demand for them. The western cities where the greater portion of the German immigrants settled desired a more central location for the seminary than New York, and the convention of 1874, held at Rochester, made a happy choice when it settled upon Milwaukee as the guardian of the institution. Here the school first began really to flourish, for no other place was possessed of such excellent facilities for conducting the work, particularly in respect to the teaching staff.

The Bund was restricted in its choice of members of the Board of Directors and Faculty, for it was unable to pay a proper salary for the labors of these men. A self-denying, disinterested enthusiasm, however, was found in Milwaukee in high degree, and the seminary has remained there ever since, to the great benefit of the Bund and its schools. Thirty-five students entered the first term. The course was six months. In order to interest the young men in the work, and to lighten the financial burden of attendance, the directors promised to procure for the students suitable employment for the day during the time of their attendance on the course. Wearied with the labors of the day, the students only devoted their evenings to the purpose of their coming. The directors soon saw that if the seminary was to fulfill the purpose of its being, the pupils must devote their entire attention to their studies. Consequently they did not offer the same promises as to the occupation for the second year. As an offset to this they shortened the term of attendance to three months. Six able young men matriculated for the second course, and all of the six are to this day faithful, successful co-workers with the Bund, notably Mr. Carl Betz, who has done much in introducing gymnastics into the schools. For the next three terms, six months were required; for the sixth and seventh, eight months, and for the last two, one year. A year is a short period to prepare for a life work, but applicants for admission to the seminary are required to possess a good preparatory school training. They must also be good practical turners. The arrangement of studies enables them to achieve results that are marvellous. At the closing examinations of the last three terms, I was astonished at the progress made by those of the young men whom I had known previous to their entrance to the seminary. From early morn till late at night these young persons are exercised in physical and mental work. From the natatorium they go to the gymnasium; from the gymnasium to the lecture-hall; from the lecture-hall to the study-room to write down their impressions of the day's instruction.

The swimming school is situated several miles distant from the gymnasium, and in summer the lessons begin as early as 5 A.M. After breakfast the students assemble in the gymnasium in order to practise singing, Turner and marching songs, under the leadership of the singing master. Then follow the exercises in theoretical and practical gymnastics, under the lead of Mr. George Brosius, who is also well known in Anglo-American circles. After calisthenic and order exercises, tacto-fencing, etc. have been given, apparatus turning is had until noon. The afternoon is likewise employed in all kinds of gymnastic work until four o'clock, when an intermission of thirty minutes occurs. During this recess the gymnasium hall presents an animated appearance. The schools have closed for the day, and from every hand the little folks pour in, in order to care for their physical nature after their mental toil. They are divided into classes, conducted by the students of the seminary under the supervision of the director. At six o'clock the little ones are dismissed and our students hurry home to enjoy their suppers and taste an hour of leisure. At eight o'clock they return to the hall to listen to the lectures of the professors. The choice of subjects is wise. One point it was especially necessary for the directors to bear in mind. If gymnastic instruction is to be placed upon the same plane as intellectual, and the training of body and mind are to go hand in hand, an educational unit, the teacher of gymnastics must not be inferior to the instructor in the ordinary schools in intellectual culture. During the last term lectures were delivered on Pedagogy, History, History of Gymnastics, Anatomy, and the Elements of Surgery. Particular attention was naturally awarded to the last two topics. The teacher must thoroughly understand the structure of the human body. He must also be ready intelligently to offer the first necessary aid to such as may be injured in the gymnasium. At 10 P.M. the student may regard his day's work as ended. Even then the pupils rarely appeared wearied. The eighteen graduates of last May appeared to be pictures of health and strength, and exhibited a power and grace that the student who has only listened to lectures and studied books never could have shown. The exercises of the graduates were carried out with precision and exactness. The teaching of the Milwaukee Turnverein was so conscientious and successful, that these young men may be sure of future reward and recognition. Indeed, every one of the eighteen is already employed, several of them in the public schools of Chicago where turning was introduced this year. The seminary sent forth many capable teachers into all parts of the country, and wherever one has broken ground the harvest has been abundant. This sketch has aimed to exhibit what a few who were possessed with love for this cause have been able to do, and how our Gymnastic Normal School has proved of value in furthering their efforts.

It is evident that the founding of such institutions must be the first step towards the general introduction of gymnastics into the schools. In many of the high seats of learning there are finely equipped gymnasiums in which the students recreate themselves after the arduous intellectual labors of the day. Yet these do not subserve the purpose of offering instruction to such as wish to prepare themselves for the teaching of gymnastics. Wherever in collegiate institutions, aided by the State, gymnasia have not been erected, these could be done at comparatively little cost. There are many instructors, too, who although they may have been engaged in the active work of teaching for many years, would willingly offer up a year's time, if by so doing they might render themselves capable of undertaking the physical as well as mental training of their pupils, and thus become pedagogues in the full and genuine sense of the term. Many of our turning teachers conduct classes composed of lady teachers in the public schools. These desire the instruction not only for the direct advantage to themselves but also in order to be themselves able to teach.

Several principals of public schools in St. Louis have engaged teachers of gymnastics for their schools, and since the school board makes no provision for such instructors, the principals pay these teachers out of their own pockets. Some of these principals have joined the teachers of the St. Louis Educational Institute, and receive instruction weekly at the hands of competent gymnastic teachers. This conclusively shows that there exists among the teachers a spirit friendly to the work. The path has been cleared, and the prejudices that formerly successfully opposed the introduction of gymnastics into the schools have vanished. The spread of the gospel of gymnastics has been carried on thus far by but a part of our people yet have they made vast progress. The first step, however, towards making Turning the common possession of the whole people, must be made by representative American teachers, physicians and others knowing the value of the work; in short, it must be taken by a National Association such as this. For this reason the N. A. T. B. looks upon this body with the deepest regard, and awaits its action with profound interest. For this reason the Bund accepted with pleasure the invitation to send delegates to this convention, and instructed its delegates to offer the active support of 23,000 turners and their teachers, and to lay before the consideration of the convention the results and achievements of their efforts.

REMARKS BY MR. HENRY M. METZNER.

DIRECTOR OF THE N. Y. CITY TURNERBUND.

The North American Turnerbund, an association of the German-American Gymnastic Societies, resolved at the last meeting, held in Boston, June 13th–17th, to send a delegation to this meeting, believing that both societies in their aims have much in common, and that mutual co-operation will be of benefit to the cause of Physical Education.

The North American Turnerbund looks upon the physical and mental culture of its members and the pupils entrusted to the care of its schools as its chief work, and for this reason regards as of prime importance the introduction of regular systematic gymnastic exercise in the schools and colleges of this country.

It is with joy then, that we greet this association, feeling confident that the cause of Physical Culture in this country will receive a new impulse through your efforts.

The Board of the North American Turnerbund of St. Louis, Mo., has appointed me to lay before you the theories it advocates, the system of physical training which is taught in its schools, societies, and in the seminary erected by the Bund, all of which is known as the German system of gymnastics, and to consider such steps as may lead to a better mutual understanding and co-operation.

It wonld be a loss of time to attempt to prove the necessity and benefits of physical culture. The question is, *How* shall these benefits be secured ? Different systems prevail, and ideas concerning them differ widely. We beg leave to recommend to your consideration the system of physical exercise that has been in vogue in Germany for the last century. It has been introduced in the schools of that country, and made one of the regular branches of study, for both sexes. It is a system which is considered, more or less, as part of the education in Switzerland, the Netherlands, Italy and France, and has been put into practice and fostered here in the United States by the North American Turnerbund. It is gaining more and more ground every year.

The German system of gymnastics, as founded by Gutsmuths and Jahn, has been further developed and perfected by numerous other pedagogues and physicians. Adolf Spies made it a special system for the training of youth, and to-day it is no longer an experiment, but is a well-established institution, the success of which finds general recognition. The German-American System of Gymnastics, founded on this, is no longer an experiment. In the 231 societies of our association, with a membership of 23,823, it is in practical use. In the schools of our societies 14,000 boys and 4,000 girls are instructed in this system. A large number of teachers of gymnastics, educated at the seminary of our association in Milwaukee, teach not only in these schools, but in American public schools and colleges, including West Point and Annapolis.

This system aims at general physical culture, and not at the cultivation of one special branch. Sport and acrobatic performances are strangers to it, likewise all emulative rivalries to gratify ambition, to make a show or to gain money thereby. By a progressive system of instruction, step by step, from the easy to the difficult, the German-American system endeavors to gain health, strength, suppleness, courage, self-confidence and other accomplishments. It does not encourage the plan in vogue in many American Colleges and in Athletic Clubs, of having a man practice what may suit his fancy, but the division into classes according to individual ability and skill is insisted upon. Individual exercise follows the obligatory class exercise. One-sidedness and specialdom is avoided, and the highest possible culture of the individual is aimed at. This division of pupils practicing into classes, and the system of class-teacher ("Vorturner") connected therewith; and the changing of apparatus and place of practice during the gymnastic exercises; together with the correctly and practically arranged material for practice, adapted to everybody, give to this system superiorities which no other system possesses. It accomplishes at the same time, results in no wise inferior to other systems. We justly claim that the boys and men, educated in our gymnasium, may, on account of their thorough general culture, stand boldly side by side with specialist or champion, in their accomplishments.

If, therefore, we give our system the preference over the entirely unsatisfactory plan of practice of so-called calisthenics in schools, and the manner of practicing in athletic clubs, according to which every one may follow unreservedly his individual inclination in practicing, we must necessarily take a firm stand against the system of Dr. D. A. Sargent, although the same has found such wide approbation and general recognition. His system, carefully studied as it is in all its details, conscientiously built up and founded on the broadest scientific basis, undoubtedly has many superior points, and is in the right where it can be strictly enforced; but we venture the assertion that in schools and in places for the instruction of the people, it is impracticable. On account of its complicated apparatus and its exercises, adapted to special cases only, it is of an orthopedic rather than an instructing and generally educating character. It is consequently more of a scientific and theoretical, than practical value.

The schools of this country need a system of physical culture, which like every other branch of study, has its place on the programme of the daily school exercise, and is taught in every class.

Pupils are tested and examined in regard to their instruction, according to their special aptitudes, their mental faculties, their liabilities to sickness and disease. Each individual is expected to pursue a grade of studies, especially adapted to his physical and mental faculties. The school cannot demand from every individual a definite amount and kind of physical exercise, nor yet a special manner of living, air, nourishment or dress. The choice of exercises should rather be such, that all pupils will take part therein with profit and pleasure, and that non participation is excusable only on the strength of a physician's certificate to that effect. Therefore, we cannot concur with the opinion expressed in the Yearly Record of the Commissioners of Education on page 98 :— "Until we have some well-devised system of exercise suited to each person, as is in vogue in the Hemenway Gymnasium, at Harvard, also in Lehigh and Boston Universities, education may well hesitate to substitute the restraints of calisthenics for the freedom and spontaneity of life in the playground." For we take it that the German system of gymnastics possesses all these merits, the earnestness of the exercise and the freedom of play, such as any rational science of education, free from all prejudice, demands.

In conclusion we would call attention to Dr. Mussey Hartwell's remarks on the German system in the "Circular of Information" of the Bureau of Education, No. 5, 1885, expressing at the same time, to the author our sincerest gratitude for his thorough and timely work, and his favorable critique on the German system of gymnastics. He says :

"While he would not disparage the merits of the gymnastic training given in the schools in Sweden, Switzerland and France, and other countries which he was likewise unable to visit, the writer inclines to the opinion that the Prussian system is the most highly developed and the best organized of the kind, and is therefore, more worthy than any other of close study on the part of those who desire to check the present tendency to brain-forcing in the education of American youth."

We wish your noble endeavor, so closely connected with our own, unqualified success. Wherever occasion offers, you will find us ready to assist you to the best of our ability.

A LETTER FROM MR. GEORGE BROSIUS,

TECHNICAL DIRECTOR N. A. TURNBUND NORMAL INSTITUTION, MILWAUKEE.

Allow me to express my heartfelt joy, that, at last our Anglo-American fellow citizens have begun to appreciate the necessity and the blessing of Gymnastic training. The unity of physical and mental development is self-evident, though it has been overlooked for centuries in the work of public schools. It is due, to a great extent, to the labor and endeavors of German philosphers and educators that physical education, almost forgotten since the days of ancient Greece, has been revived, and a system of gymnastics has been developed as nearly equal to the needs of our present generation, as was the system of physical culture of the Greeks for the Athenian youth. Even in this country, the Germans may claim to have been the first to introduce physical training in the education of youth. In this department for more than twenty-two years our Turnerbund has labored and struggled. We have 236 local associations with a total number of 25,000 members and 205 gymnasiums with 20,000 pupils, 15,000 boys and 5,000 girls and 104 teachers of gymnastics.

It has founded a Normal School at Milwaukee, for the instruction of gymnastic teachers. I have been the technical director since its foundation in 1874. During nine full courses it has furnished 86 teachers. The graduates, with the assistance of the members of the Turnerbund and others, introduced gymnastics into the work of not a few public schools in the cities where they reside. Thousands of school children have thus received the benefit of physical culture.

But much remains to be done. Of the twelve millions between the ages of six and twenty, how many millions are yet untaught. Gymnastics in Germany have been required in common and higher schools for several decades. Should a Republic like ours be inferior to that of a half despotic Empire?

I was much pleased, then, at the first intimation of an increasing interest in this subject on the part of the Anglo-American portion of our population. Though the efforts of their educators and men of letters were confined to the introduction of special forms of gymnastics, even this was a step in the right direction. The value of the German system as devised by F. L. Jahn, Guthsmuths and Spiess is being appreciated. It is principally due to the efforts of

Dr. Sargent that the attention of the public has been called to "*Das deutsche Turnen.*" Combined efforts, however, are indispensable. All narrow prejudices and jealousies must be set aside. If we consider how much good our Normal Institute has already done, in spite of its relatively small means, we shall realize how important it is to secure the co-operation of the government in organizing a National Normal Institute of Physical Culture, the chief object of which should be the thorough education of gymnastic teachers, according to the most improved principles of pedagogic and physiological science. To make the necessity of such an institution evident, should be the first and most important object of your association.

I suggest that this point be discussed at your present meeting.

With the request to add my name to your membership and with best wishes for the success of your transactions in Brooklyn,

I remain,
Yours truly,
GEO. BROSIUS.

EXPLANATIONS.

Academic distinctions have been used with some degree of inexactness. Some contributors, for instance, to whom the collegiate title of "Professor" may belong have modestly dropped it in their papers or in their postal address. The printer has simply followed copy.

In the article on the Eye, the second line should read No. + .75 Diopric, with the minus sign in the next line. Near the bottom of page 11, read .5+H.=.8, and in the next line .5+H.=.5. So on page 12, line 6, insert plus before My., again in line 9 and 11.

Line 23 reads V.R.E=.7+As. Plus marks should precede, in the next five lines, the terms My. and As., also H. in line 28, which would stand V.R.E.=.6+As.

The worsteds referred to in page 13 can be purchased by Boston readers of N. D. Whitney, 129 Tremont Street, for $1.25.

The Committee of Publication were obliged to use some verbal condensation in order to bring the papers into reasonable bounds, but without impairing the unity of thought, the fullness or exactness of statement. As the membership increases, or as special donations of money for the purpose are received, the Association will be able to present a more valuable volume of its Proceedings year by year.

☞ Persons desiring to become Active or Associate Members can forward at once their names and admission fee of one dollar each, to the Secretary. They will then be entitled to a copy of this volume, and their election will take place at the next meeting.

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R. J. Roberts, Y.M.C.A., Boston, Mass.
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Prof. A. C. Wadsworth, Adelphi Academy, Brooklyn, N.Y.
Mary K. Wilson, M.D., N.Y. city.

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* Deceased.

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PROCEEDINGS

OF THE

AMERICAN ASSOCIATION

FOR THE ADVANCEMENT OF

PHYSICAL EDUCATION,

AT ITS

THIRD ANNUAL MEETING AT BROOKLYN, N.Y.,

NOVEMBER 25, 1887.

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Prof. D. A. Sargent

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF PHYSICAL EDUCATION

THIRD ANNUAL MEETING.

BROOKLYN, Nov. 25, 1887.

The Association met at Adelphi Academy at 10 o'clock, and was called to order by President Hitchcock. Rev. Dr. Talmage offered prayer.

The records of the last meeting as printed were adopted. The President appointed Drs Backus, Perkins and Savage a committee to nominate officers.

A paper was then read by the retiring president, Dr. HITCHCOCK of Amherst College.

Mr. E. H. FALLOWS of Adelphi Academy, read a paper on "Physical Training in Elementary Schools of the United States," being an extract of his Report to the State Board of Health for New Hampshire.

Mr. C. G. RATHMAN, N.A.T.B., St. Louis, read a paper on Physical Education, and offered the following, which was unanimously adopted:

Whereas, A rational, harmonious system of education affords the best and surest guaranty for the welfare and stability of a republic;

Whereas, The present system takes into consideration the training of the mind only, almost totally neglecting that of the body;

Whereas, It is now universally conceded that physical training is a most essential factor in the education of the child with reference to his intellectual, moral and physical nature; and

Whereas, Physical training has been introduced into a great many schools of our country, and wherever introduced has given the utmost satisfaction; be it

Resolved, That the Association for the advancement of Physical Culture recommend to all the Boards of Education in this country to embody physical culture in the course of study of the schools under their control.

The Committee on Nominations reported, and their report was adopted, constituting the following gentlemen officers for the ensuing year :

President, WILLIAM BLAIKEE, Esq. of New York City.

Vice-Presidents, D. A. SARGENT, M.D., E. P. THWING, M.D., Ph.D., and Miss H. C. PUTNAM.

Secretary, W. G. ANDERSON, M.D. ; Treasurer, E. M. HARTWELL, M.D., Ph.D. To complete the council, H. M. Starkloff, M.D., C. M. McIntire, Jr., M.D., and E. Hitchcock, Jr., M.D.

Mr. Blaikee took the chair and spoke a few words in reference to the widening field of influence open before the Association, and pledged to it his hearty sympathy and best endeavor.

Prof. A. CUTHBERTSON, instructor in Rutgers College, spoke on the need of more definite and aggressive steps in our work as educators. It is very well to talk with each other as to what our studies and observations have shown imperatively necessary, but we must adopt some means to make our influence felt upon the community through those who control educational agencies.

Prof. E. P. THWING, M.D., cited the example of the International Medical Congress in which he had recently participated at Washington. The recommendation of measures which had been discussed by the whole body carried weight which no individual utterance could possess. Persecutions in Austria were arrested, some years ago, by the united protest of an International Alliance of the friends of freedom. It is our function as a national body to signalize the evils just referred to in our educational system, and in the person of our President or a Committee to memorialize those who have power to rectify them.

Dr. BACHUS of the Packer Institute suggested that President Blaikee address the Board of Regents and Associations of Teachers. Simple, inexpensive apparatus may be used, and thus obviate one excuse for neglect. Dr. SAVAGE remarked on the value to himself of very simple gymnastic exercises.

Dr. HUNT, lecturer on Hygiene at the N. J. Normal School, said that it was the privilege of each educator to be a living witness himself to the value of Physical Education. Prof. BROSIUS alluded to the evil influence exerted on pupils by the indolent attitudes and careless movements which some teachers indulged in.

Prof. METZNER and Secretary ANDERSON added brief remarks.

If a school-room allowed but twenty inches space between the desks of the children, the exercises with the arms are necessarily limited.

H. M. **Starkloff**, M.D., President N. A. Turnbund, then read a history of that association.

It was voted that Dr. Anderson serve as treasurer, *pro tempore*, in the absence of Dr. Hartwell.

AFTERNOON SESSION.

The Treasurer's report was read.

Dr. J. W. **Seaver** of Yale University offered the following :

Resolved, That our president, Mr. Blaikee, be requested to present our resolution regarding Physical Education, in such a manner as may seem to him most fitting, to the National Social Science Association, the American Teachers' Association, the American Educational Society, and, so far as possible, to State and County Boards of Education.

Resolved, That we as an Association form a Committee of the whole to report to our President special opportunities for influence.

Dr. **Edward Hitchcock**, jr. of Cornell University, read a paper on "The use to the individual of Physical Measurements."

Dr. W. L. **Savage** of the Berkeley Gymnasium, New York City, continued the discussion.

Dr. **Sargent** said that he hesitated to publish data, and deprecated hasty generalization from inadequate examinations of facts. We need a working basis that will not be misleading. From ample data we may make deductions and arrive at the relative standing of a man. We must not look at picked men. We need exact truth before we appeal to the public. Experts should have some agreement among themselves.

Dr. **Hitchcock** of Amherst, disclaimed the possession of any "system," but had recorded results—errors they may be, in some cases—but we cannot wait for the typical man. Our mistakes may help us to reach the ideal.

Dr. **Hitchcock** of Cornell University, wished to know more about what the typical man really was.

Dr. J. W. **Seaver** then read a paper on "Military Training as an Exercise," which was discussed by Gen. E. L. **Molineux** of Brooklyn and **John** S. **White**, LL.D. of New York City.

Dr. **Worthington** of Boston said that 1,300 of the 56,000 pupils of the schools of that city were drilled with muskets weighing from 7¾ to 8 lbs. each, purchased by the city at a cost of $6.50. Spinal curvatures have resulted in some cases, as three-quarters of the work comes on the boy's right side. This drill began after the civil war, and had in view a citizen soldiery. Lighter muskets, made of solid oak for 22 cents each, answer every purpose.

Prof. Brosius remarked that the wand should be used till the pupil is 16. Light gymnastics give strength and discipline. Prof. B. masses and moves 500 youth in the gymnasium.

Prof. Eberhart of Boston invited an inspection of his school and methods.

Col. Mason of the National Guard, Brooklyn, did not know of one of his associates at West Point, a score of years ago, who broke down from excessive exercise. In fact it was impossible to kill a cadet! He extolled the influence of military discipline on mind and heart as well as on the body. Man is the real product to be sought, not muscle. John L. Sullivan is *not* the "typical man." The habits of unquestioning obedience, of self-abnegation and heroic manliness, are results of what, to some, seems austere discipline.

Lieut. Koehler of West Point, could recall but five out of 700 cadets, who in several years had been unfavorably affected by military drill. He advised, however, a light apparatus for school drill.

Dr. Sargent urged that deformities do exist, as photographs show. Moreover, we are to cultivate the moral sense in a young man, and not be content with his obedience to a petty officer, so long as he is under his eye in school or barrack. Look at a man from all sides, as he appears in all vocations. Combine, and thus secure the completest results. Thus alone we meet the wants of American youth.

Secretary Anderson spoke briefly of his visit in the West, and of the excellence of the German system.

On motion of Dr. McIntire, all papers read were referred to the Council.

Fremont Swain, M. D., read certain data which he wished added to the Report on Measurements printed in the last volume of Proceedings, and which were now before the Association for consideration and adoption.

On account of the lateness of the hour it was voted to lay the whole matter on the table until the meeting next year.

Voted, to accept the invitation to meet in 1888 at the Berkeley Lyceum, 19 West 44th Street, New York City.

Voted, that our thanks be tendered to the Trustees of the Adelphi Academy for their hospitalities.

Adjourned.

William G. Anderson, M.D.,
Secretary.

PRESIDENT HITCHCOCK'S ADDRESS.

We are gathered here again by favor of Divine Providence and the kindness of the Trustees of the Adelphi Academy at our third annual meeting, to look each other in the face, grasp each other's hands, exchange our ideas, discuss them in a kindly manner, and then go back to our work with renewed vigor and reinforced methods and ideas. And we can congratulate ourselves that we are working people—quite a popular cognomen just now—for there is no one who is engaged in teaching or developing the cause of physical education to-day who can be a drone or get into very deep ruts, because the stimulus of human progress will soon ditch his or her train if the vehicle of physical education is not running ahead with speed on a good road bed and with the best of rolling stock.

And yet what has been our progress during the last year? Has there been a great advance in one or more directions? Has physical education taken a leap? Has it received an immense endowment from anybody or anything? The events of our history seem to show the slow and steady growth rather than paroxysmal throes and convulsions. Our work seems to have been more like a healthy and normal season of trade and business, not a bull or bear market, but all with something to do and everybody making a fair living.

Among our chartered and private educational institutions physical education, as a branch of instruction, is more than ever before accepted and adopted as an essential part of every curriculum; and our public school systems, especially in our large cities and towns, are not lagging behind in this.

The great increase in love of athletics and out of door sports—saving the gambling and rottenness which fixes itself upon anything which is sound and prosperous—is another indication that our association work is gaining a steady hold and a permanent place in the community. Our Y. M. C. Associations are now as sure to have a gymnasium and a good director of it as they are to have a reading room, a school, or prayer and praise meeting hall in their buildings. Body and heart and soul must go hand in hand. "What God has joined together let not man put asunder."

And some of our strongest railroad corporations are sure that they get better men for their service, and get better service from their men, if they give them easy access to a good reading room, a good bath room, and a good place for bodily and mental exercise and recreation.

The progress in physical education has not all been in a material direction, that of constructing suitable buildings, inventing the best apparatus, and teaching men mere physical motions and material methods of properly developing muscles and bodily tissues. The starting of schools for educating teachers in the principles of physical education has been an eminent feature of late in our work.

And the prominence of Anthropometry in athletism and physical education, as evidenced by the brilliant articles of one of our vice presidents in *Scribner's Magazine*, is not the least valuable and ornamental work in our Association. Educators and hard common-sense business men are determined to know all they can about the proper and normal proportions of the body, and what it can be expected to do and what development may be obtained. We are all beginning to ask what was the ideal form and proportions in the mind of the Creator when he said, Let man be formed in our image.

We are gathered here to talk, think over aloud, and discuss the best ideas of our own and other people about the physical education of men and women and children. Let us each one endeavor with scrutiny and enthusiastic zeal to learn from others what are the best pieces of apparatus to use; what are suitable exercises for differing ages, temperaments, and the differing mental make-up. Let us question each other to learn details of our work. Let us gather information and wisdom how to direct and encourage outdoor and athletic sports; how to absorb all the possible good and eliminate the bad in these attractive and healthful means of exercise and recreation. Let us seek for the best items of study in the measurements, tests, and development of our physical bodies. May we make a careful study of how to find and point out remote and immediate weakness and tendencies to weakness in those who are in our hands for study and advice. And when we find noble and perhaps typical individuals, let us learn the present and ancestral causes which have given the healthful body, and endeavor to find out how to continue this perfection of form and beauty, how to pass it along down the line of coming posterity, and if possible improve it.

And yet let us remember that the body is not the ultimate end of all our study. For though the well developed and sound body promises the sound and strong mind, yet may we remember that ever so brilliant a performer cannot make good music on a poor instrument. Let the thought be eminent and predominant with us that the highest aim of all our special work is to develop the most perfect type of man and woman in body, soul and spirit. And that the loftier the character and the purer the soul, so much the more refined and elevated will be the body itself.

> "For every spirit as it is more pure
> And hath in it the more of heavenly light;
> So it the fairer body doth procure to habit it,
> And is more seemly dight with cheerful grace and amiable sight.
> For of the soul the body form doth take,
> For soul is form and doth the body make."

EXTRACT OF A REPORT.

By Mr. Edward H. Fellows.

Systematic physical culture was introduced into the public schools of Kansas City in October, 1885, by Carl Betz, who offered to teach and superintend the exercises in all the schools gratuitously for a term of three months. In December of the same year he was appointed superintendent of physical culture by the Board of Education. He has been very successful in his work, and has placed physical education on a firm basis in Kansas City. Prof. Betz has kindly written the following letter, explaining his method of work :

"The work in our schools is now fifteen months old. In Chicago systematic bodily culture has been introduced into the public schools only since last September. Our plan of instruction at present is the following: On every

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of skilled professors of Physical culture, nothing more in the way of material could perhaps be desired, and all our efforts could be directed to the best methods of using them for the attainment of the end desired. In this matter-of-fact prosaic age, however, we must content ourselves with a more gradual development, under the leadership of science, approved and aided by experience.

And what, I ask, has been attained in the line of physical improvement of the masses, by Harvard, Yale and others of our great learned institutions?

Some prodigies of individual development who have reflected "athletic" lustre upon their Alma Mater, but the great mass of our college graduates give but little proof of practical physical education. This, allow me to say, is the fault of the system, or rather of the want of system which I regard as the radical defect of the ordinary school or college gymnasium. The problem, then, is substantially this: How can we give physical culture to the greatest number with the least expenditure of time and space? I answer in general terms: By reducing present methods to a system of military training.

And what is military training? It is the synonym for implicit obedience! Ear, eye, muscle and WILL,—all subservient for the time being to the controlling will and the directing voice of another.

Visit one of our best city gymnasiums, thoroughly equipped with all the most improved apparatus that science and experience can suggest, and under the direction of one of the wisest and most accomplished of professors, and three things will force themselves upon your attention.

First.—The lack of attention to class exercises, in the majority of the pupils, with the manifest anxiety to be up and away to some more agreeable feat, in the performance of which they possibly excel.

Second.—The small and feeble boys are crowded out of their places by the more robust and domineering, thus failing to receive proper attention from the instructor and benefit from the exercise.

Third.—The waste of time and power attending the thoroughly conscientious, but comparatively fruitless efforts of the professor to discharge his duties, all owing to utter absence of discipline.

Professor Hitchcock of Amherst is reported by a scientific journal as saying, "Military drill is objectionable on account of the character of the exercises and on account of the discipline. If we desire," he says, "to make a mere automaton of a boy, to deprive him of his thinking faculties, to make him dependent on orders and directions of others, then military drill is a good thing."

It may seem rash to question so high an authority, but let us look this position boldly in the face.

Is the training which military ethics demands for the body essentially different in principle from that which science and experience prescribe for the mind?

The reasoning faculties of youth are carefully trained in our schools and colleges, and developed step by step in accordance with rigid laws, and for the time being the boy, in the mental processes of mathematics or any other study, is an automaton, confined and governed by the laws of the particular science to which he is devoted.

It is hardly necessary to carry the analogy into the realm of moral, social, or political ethics; they are the subjects of inexorable laws which demand implicit obedience as the price of success, and ever hold the sword of retribution *in terrorem* over the head of the transgressor.

If the law, then, is the foundation of order in the natural and moral worlds, what more important lesson than implicit obedience to lawful authority can we impress upon the minds and lives of the young? and what method has the concentrated wisdom of ages ever devised that will do this so effectually as military training?

Gentlemen, I fear that some of you are frightened by the term "military training." Dismiss the expression and adopt some more congenial style; and further, if you see objectionable features in strictly military exercises, drop them too!

I have heard objections to the manual of arms, to the handling of the rifle, to the uniform, and other kindred non-essentials. Well, throw aside the rifle; exercise if you please in the semi-nude costume of the gynasium; instead of companies and battalions, divide your forces into classes and dignify the Corporals, Sergeants, and Captains, with the more intellectual titles of Monitors, Teachers and Professors. I stand before you not to insist on minor details, but to advocate the principles that underlie true military training. Let us look for a moment at its practical bearing applied to the gynasium as a school of progressive exercise of brain and muscle.

Apply your admirable methods of mental culture to the preservation of health and the physical development of the body. Divide your school into classes graded according to size and strength. Take the "little tot" from the nursery and teach him the A. B. C. of physical training, exercising him by the word of command to such primitive movements as his little hands and limbs are capable of ; and simultaneously teaching him the cardinal virtue of *obedience.*

As in the school for mental training, proficiency in one class should be duly rewarded by promotion to a higher, thus fostering a healthy spirit of emulation which will greatly accelerate the pupil's progress.

Considered as a necessary relaxation from mental strain, I would have the physical exercises of the school, whether for boy, girl or the maturer scholars, treated as a study and subject to orderly control. By the military method of movement in ranks you multiply indefinitely the efficiency of the teacher, for by this system he can instantly detect any irregularity of motion or impropriety of conduct, which in the present desultory mode of independent exercise it is impossible to do.

Nor do the narrow limits of school building or yard present an obstacle to the universal physical training of youth of both sexes, if military methods are employed ; for the run, the jump, and general calisthenics can be practised in ranks within one third of the space required by independent and discursive movements.

Summed up, then, the benefits which military training offers to the schools of the land are briefly these :

Implicit obedience to lawful authority.
Progressive training of the body and its parts.
The massing and moving of large numbers in limited space.
Cleanliness, rapidity and precision of movement.
Alertness of eye and ear.
Physical hardiness.
Mental endurance, (or patience).

But great as are these benefits of thorough physical training by military methods to the individual, they are equally so to the nation. The Prussians have given to the world the axiom that "whatever you wish to appear in the life of a nation you must put into its schools." And what more necessary to the life of a nation than the means of its preservation? and those means are embodied in the training your young men should receive in all your public schools. Can you as their parents and friends afford to neglect the training necessary to fit them for the burdens and responsibilities which they may be called upon to bear ; a training which will lessen the dangers of active service by at least one-half, while increasing their capacity for usefulness to their country many-fold?

War, under the most favorable circumstances, is a thing to be dreaded, but its evils are intensified in their effects on the unprepared soldier because of his utter ignorance of how to care for himself, and he sinks from unaccustomed fatigue and exposure which proper preliminary training would have fitted him to endure. As educators, you cannot ignore the needs of the country, nor the necessity of inculcating, with the arts of peace, patriotism and the best preparation for defence in time of war.

A pressing want of the day is thoroughly educated and competent professors of physical culture, but until some public spirited benefactor like your host, Mr. Charles Pratt, shall endow a Normal Institute for the training of male and female teachers, I fear the demand will not be supplied.

If we examine the statistics of our late war, and contrast the percentage of deaths from fatigue and exposure with that of the Prussians in their late war, we cannot help feeling that there is something radically defective in our physical culture as a nation.

And no one perhaps realizes this so fully as the soldier ; he who has felt it knows with what aching heart the conscientious officer endeavors, with a smile upon his face, to cheer the poor, desponding victims overcome by unaccustomed strain before they have even reached a field of battle.

What appeared in the "*Forum*" a short time ago? This : "The whole apparatus of education from top to bottom fails unless it chastens and molds the mind to orderly methods. Not more self-reliance, but more intellectual humility, is now our national want." Apply this to our physical needs as a nation. We have self-reliance, but we want an orderly system of bodily training, which can only be obtained by the discipline of youth as a part of their education in the schools throughout the land.

The learned professor turns out from his college, periodically, a certain increased percentage of perfect physical manhood ; individuals who beat the record in field sports. This may be gratifying to our pride, but what we need is the "toning up" of the great unknown masses of the young workers in our public schools. Great things might be expected in military life from the athletes of Yale and Harvard with such brawn and brains as theirs, but unless trained to act in unison. and submit with cheerful obedience to military discipline, they would simply be a hindrance.

An ardent lover of peace and a firm advocate of arbitration instead of the sword, I still see that the day is far distant when our institutions will cease to be jeopardized by the inherent depravity of human nature. Foreign wars or domestic broils may break upon us when we least expect them, and woe to us if we are unprepared.

Our Republic, containing 7,000,000 men liable to military duty, supports an army of 25,000 men, a fraction less than 3–8 of 1 per cent. only being taken to support the national power. How apparent the necessity of having the great reserved force trained so that the farm laborer and the collegiate, the wise and the simple, the timid and the brave, shall all alike trust and obey lawful authority so necessary in time of emergency.

Gentlemen, the cause of education in this country is in your worthy and experienced hands. To you belong both the honor and the responsibility ; deliberate wisely, examine well the military systems, and adopt the good of each, but, above all, insist upon the same diligence, attention and obedience in the gymnasium, as in the school or college.

MILITARY TRAINING AS AN EXERCISE.

By Jay W. Seaver, M.D.

1. What should exercise be and do ?
2. Does military drill fill the requirements ?

The primary idea of exercise is to develop the organs concerned so as to increase their functional capacity. Maclaren crudely defines it to be "muscular movement." Raymond says that exercise is "the frequent repetition of a more or less complicated action of the body with the co-operation of the mind, or of the mind alone, for the purpose of being able to perform it better."

Whatever technical definition we may adopt this is clear, that we have all agreed that the end in view is a man fitted for the exigencies of life as well as for its known routine of duties The means towards this end are various, but all have in view in common the physiological law of the gradual natural adaptation of a part to meet the requirements placed upon it. In the beginning of our lives there is probably no voluntary organ that is ready to go on with its work in complete form, and the perfect activity of the expert is the result of thousands of tentative efforts that have gradually approached the ideal of the artist, until he excels in his particular line of work. The result of these efforts is found to be not only new facility in movement but change in form. This fact has been so long observed that we have come to the point of assuming that a particular shape is proof of ability in certain directions or disability in others. The proper balancing of parts so as to give the greatest general physical ability will also give us the typical man. The exercise by artificial means of any parts that are neglected by the regular habits of life has gradually become the means employed to improve the physique of the young and the health of persons of mature life, although physical improvement is not limited to any age.

If any other way of securing development than by repeated use of the various organs was presented, our attention might here be diverted to the various processes recommended by some, and opposed by others, but the opinions and assent of all run together thus far. The dissent is on methods. And differences may be sources of unbounded good, since discussion and rivalry may produce a popular enthusiasm and discussion, and the adherents of each school will strive more earnestly to present good results of their work.

In recent years a school of educators, taking their cue from the martial spirit engendered by the last civil war and manly bearing of our citizen soldiery, have established schools on the military system. The idea of discipline and physical culture has been the prominent one. Just how far a military drill can be useful in these schools in gaining the desired end it is now our purpose to inquire.

In youth, or the period preceding legal majority, I apprehend that the leading idea of exercise is development, as in mature life it is health. Nature seems to have so arranged our lives that as boys we run and essay the performance of every act that we see done. We are not methodical in movement; we hate routine, and shout and are never quiet; every muscle of the body is brought into play a thousand times a day ; every perverted shape or abnormal action has a charm for us; in short, we are boys. In the maturity of manhood a vast change comes over our rollicking boyhood. With maturely rounded form we walk staidly to our regular duties, work hard without worry over the duties of the day, but are perplexed and troubled at any disturbance of the smooth surface of every day life. An exercise, then, that would be manifestly adapted to the physical needs of the boy, would unfit the man for the enjoyment of life, and might be even disastrous to health.

What then is the proper course of physical exercise for a growing youth, and how does it contrast with what is required for the mature person? An intelligent answer to these questions will determine largely the true province of military drill as an exercise.

1st. The element of sport or fun must enter largely into the exercise that will best develop youth. The young of every species of animal is fond of play, and its muscular development for predatory life or for self-preservation is obtained by the gambols and mimic fights that we see every day. Even as sly and suspicious an animal as the fox brings its young from the burrow to sport in the sunlight, while the mother alternately watches for danger and takes part in the frolic ; but when the young are mature they seek the darkness and solitary life.

Thus one element of youthful character is the one that we like to see prolonged into mature life, for our gray-haired friend who has a boy's light heart is the one we love and trust. An exercise without sport would be no exercise at all to the boy, but would be a sad task to be wearily dragged through, without benefit and with actual loss. The development of the nerve centers, and the co-ordinating power of nerve ganglia must not be forgotten ; we must, so far as possible, include nerve training with muscular, for the interaction of muscle on brain, counts as powerfully and favorably on brain-development, as that of brain on muscle does on muscular development. Nor is simple development of intellect what is meant here. We may have fine intellectual powers and attainments in persons whose condition is like

> "Sweet bells jangled, out of tune and harsh,"

whose central nerve power may be grand, but whose peripheral ganglia may be so morbidly out of tune as to make every process pathological. Dr. Lewis had this one point in view when he invented a system of exercise that would bring people together in a contest of very mild character, over bags filled with the celebrated Bostonian article of diet. He wanted to recreate nerve power. It is this element that makes the common athletic games so attractive to the young, and so praiseworthy in their results. They never think of the physical benefit they receive when a hard run secures a touchdown, or a hard hit brings in the winning run, or a hundred yard dash wins a trophy for a school or college.

The extent to which muscular ability is dependent on nerve excitement may be illustrated by the muscular activity or work done by a football player during a game of an hour and a half. The whole system is awake and active in the highest degree, the perspiration flows in streams; bumps, bruises, scratches follow in rapid succession, perhaps a bath in muddy icewater adds to the discomforts, but the player heeds not, and as a rule no harm follows to detain our enthusiast from the field on the following day. Ask the young man to go through the same evolutions alone, as far as possible, and the effort would be rewarded by a hospital berth after the second day. The will could not bear the burden and compel the necessary exertion. Exhaustion would be sure to follow. Our football men are not exhausted—most of them gain in weight during the training, their muscular condition is vastly improved—they are full of life. They do good work in the recitation room.[*] They are the influential men on the campus, they make the aggressive, successful men in life.

We do not consider athletic sports of the most vigorous kind well adapted to mature life. One game of football would be too much for most of us, but we could outwalk the best men in the team. What we do urge is, that this element of sport must enter largely into the recreative pursuits of adults. The oxen unyoked after a hard day's work, clash horns in mimic battle for a few moments before feeding. The horse finds new life as he approaches the end of his day's labor, and prances homeward in the best of spirits.

We Americans will hardly be in danger of introducing too much sport into the physical education of our youth, while nervous diseases and prostration are so common with us. The peculiarity of American diseases is their neurasthenic type. We shall reduce the evil only as we better educate the nerve system for labor and for rest. We cannot rest from the worry that eats into our lives, unless some attraction draws us out and away from ourselves, and centers our minds on something pleasant to contemplate.

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[*] The best freshmen crew Yale ever had was made up of ten men, two of them substitutes, and a coxwain. Only one of the eleven men was below the first scholarship division, and he was in the second when there were three divisions.

The element of companionship or social instinct is another point that must not be overlooked in deciding on the merits of an exercise for old or young. We were not intended for hermits. As boys we loved to steal over to Johnny Smith's, and while away otherwise tedious hours at marbles, mumble the peg, leap-frog or some other of the thousand and one games that every boy understands. As men we do the same thing, only in a slightly different way. This joyous companionship of boyhood taught us how to estimate character. We know every mean trick and every worthy trait of every boy that we ever played with. Do we know as much about the later friends of our lives? Can any flight of the imagination conceive how this knowledge of humanity could be obtained in military alignment? I deem this idea of companionship so important that I advise students never to go out for exercise, even for a walk, without a companion, selecting the chattiest, liveliest, lightest-hearted acquaintance, the Munchausen of his class, whose wit and humor and sense may blow fresh breezes through his soul, as the fresh air cools his temper and flushes his skin. Melancholy will pursue like a fiend the brain worker, who associates only with himself.

The element of regularity and time is also of importance in securing good development, and all exercise should be graduated to meet the new demands of increased growth. We recognize this principle in mental development, and the teacher who would propose to begin a course of mathematics with a pupil, by assigning a lesson in calculus, would occupy a no less objectionable position than he who would propose to keep his pupil continually reciting the multiplication table. A proper course for physical education must begin with simple movements, and gradually lead up to the more intricate and complex. The interest must be continually excited, or the zest that makes physical exercise a recreation will not be present. This interest may be stimulated in various ways. In some cases the simple pride in form and pleasure in muscular exertion will be a sufficient bond to hold them to the dullest of routine work, but this is not the average youth. Others must look forward to prizes and decorations and honors. Others will be eager for the excitement of contest and competition. This last class I judge to be the largest one among people of Anglo-Saxon lineage.

It is this feeling that makes a game of tennis enjoyable, or baseball on an open lot, with a torn ball and everybody for umpire. There is no prize here, there is no honor, there is no new stripe on the coat, (except perchance, the sad one of dishonorable filth, that will be recognized by the proper parties at home, and expiated by other stripes running around the legs). It is this innate love of competition that makes us a commercial, an enterprising nation. We measure ourselves with others and find where we are weak and fortify ourselves; we find where they are weak and we outstrip them. Our popular athletic games then are real educators and prominent factors in building up national character.

The element of moral discipline must not be overlooked in our judging the worth of any particular form of exercise. The success that the military method has had entitles it to high consideration. I am inclined to think that, next to self-government, it has been most successful. The able article by Prof. E. L. Richards in the *PopularScience Monthly*, 1884, February and March, states fairly the influence that the Yale system of athletics has had on the general enforcement of college laws.

> "(3.) The system is conducive to the good order of the college. It conduces to good order in furnishing occupation for the physically active. There are men in every class who seem to require some outlet for their superabundant animal life. Before the day of athletics, such men supplied the class bullies in fights between town and gown, and were busy at night in gate-stealing and in other pranks now gone out of fashion. * * * Any instructor who has kept track of the ways of college during the past fifteen years cannot fail to be struck by the decreasing number of the really great disorders, by the mildness of those which remain, and by the increasing regard on the part of the students for college authority, college property, and for the rights of fellow-students."

This system is strictly one of self-government, the same as that in vogue at Amherst College, whence our veteran President sends out his favorable report of an experience of twenty-five years. He says in Report of Twenty Years' Experience:

> "While our methods are not so perfect as might be devised with more complete apparatus and better men to direct, if health of College be the only thing to be considered, they do seem to be good as far as they go; enough for the large majority, and of some service to all. And though there are some in every 40 or 50 young men among us who would be undoubtedly better for more stern

and rigid discipline, yet College seems, with its present appliances and the time which can be taken for physical care and guidance, to be doing the best thing it can for the bulk of the students, in the matter of required exercises."

I may add that Dr. Hitchcock encourages outdoor sports practically, by excusing from the regular light gymnastic work all students who enter to contest any event in the Fall or Spring field meeting of the athletic clubs,—the period of excuse being the period of preliminary training. The same method is employed at Yale, where the required work ends with the spring term of freshman year. The idea of teaching men to manage themselves is becoming deservedly popular and is decidedly American. The idea of absolutism, whether military, political or social, is repugnant to the American mind, and a boy will naturally shrink from the stiff formality of obedience to orders that direct to work that is more or less irksome. To make military drill popular with boys, you must greatly restrict their other means of free exercise, and you must also leave out the tedious "setting up" drill, that for exercise and development is worth all the dress parades and brass buttons and gilt stripes and white gloves that could be crowded into a school course. The attractive part of military drill to an unprofessional observer may inculcate habits of strict obedience to law and authority,—a good quality, but it means very little in the way of physical improvement and growth. But this same quality of obedience and stern moral discipline is found, not under military systems, but in highest form in the self-governed company of young men who compose a college or school team. A boy may disobey parents, cheat in recitation, manipulate a crib at examination, have many bad habits, perhaps some vices—but when he gets on the football team, or is to contend in any athletic event as the representative of his fellows, he will never fail in the high obligations of obedience and morality. The Yale man never yet lived, I may say never will live, who could even be accused of selling out a game to Harvard. Nor would one be guilty of disobedience in matters pertaining to constituted authority. Having elected a captain, his commands are law.

There is also a stimulus to originality in out-door sports, and even in gymnasium work, that cannot exist in following out directions for movements that are given arbitrarily. Even the officer who does the thinking for a company tries to follow the path marked out by others and continually consults his guide book.

I have thus far spoken of some of the requirements of exercise for the young, and have treated them mainly from the psychological side. For a more elaborate treatise on the subject from a physiological standpoint, I refer you to an able article by Dr. D. A. Sargent in the *Boston Medical and Surgical Reporter* of Sept. 16, 1886. The historical statement of the case by Dr E. M. Hartwell stands beside the above and will amply repay the reader and student, while articles in the same paper in March and April of the current year "On the Physiology of Exercise" are a candid, dispassionate statement of the physiological effects of and reasons for exercise. It remains for me now to speak of military drill alone in its influence on the physical system, and attempt to show, as I believe it can be shown, that it is a reasonable and suitable exercise for the mature.

In manhood we have passed the period for making radical changes in physical forms. The gradual hardening of the firmer tissues with age has left us with flat chests, curved spines, tipped shoulders, small muscles or the reverse, and, do what we will, the remedy is not complete. On the other hand, an exercise that in the youth would tend towards imperfection, in the man tends only slightly to asymmetry and is simply partial exercise.

Now the practice of the manual of arms and the various evolutions in marching constitute nearly all the exercise of a modern military company when at drill, and the recruit when promoted from the "awkward squad" is never practised in the "setting up" movements. One reason for this is the tightness of padded clothes that hold the thoracic muscles as in a vice and prevent suppleness and flexibility. The statuesque attitudes of military men when at drill are partly due to the same cause. The weight carried may vary from 8 to 18 or 20 lbs., so there is resistance enough to bring out considerable general muscular effort even if 8 lbs. of the burden be almost continually supported by one side and the manual be arranged without regard to ambidexterity.

The out-door work is generally unsatisfactory because of bad weather and its discomforts and exposures, and even with Jupiter favoring, the march is apt to be long and tiresome. How, then, is the average man to be benefitted? I answer, in this way: [1] The military drill exacts no sudden outlay of force, but is largely mechanical repetition such as suits maturity. [2] The military atmosphere will stimulate to erect carriage and good form. The activity required is considerable. [4] The mental training is toward attention and rapid execution. [5] The exercise is varied so as to give general muscular action; as by rifle practice, marching double time, manual, etc. [6] There is no excitement and its consequent over-stimulation in the work. [7] The time of work is more general than for any out-door athletic contest or game. [8] The moral influences are good. [9] The results furnish us with a partially trained military force without the expense of time or money required in elaborate military systems of government.

But even for healthy men the simple drill of camp life is not sufficient for health and development, and in the best-known military systems is supplemented by gymnastic exercises. I quote from a German army report on gymnastic exercises for infantry:

> "Gymnastic exercises constitute an essential factor in the military training of the individual man. They should not only increase the strength, agility and endurance of his body, but should strengthen his will power, resolution, self-confidence, and courage, and call forth a healthy spirit of emulation. In order to attain these ends, the soldier must be taught the natural, sure, and energetic use of his limbs by means of properly devised exercises.
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> Turning should be practised by all the men from the beginning of their term of service, due regard being had to individual peculiarities and circumstances. During the entire term of service the free and weapon exercises are to be pursued as exercises for the promotion of the soldier's health. In the course of every hour devoted to gymnastics, all parts of the body are, so far as possible, to be brought equally into play. In judging of the excellence of the exercise, strength, dexterity, and the carriage and control of the body are to be considered, rather than the difficulty of the exercise. The performance of gymnastic tricks and feats is never to be considered the aim of the exercises."

And the French general, Millot, says: "Train gymnasts for us; our officers and under officers will soon make soldiers of them." So it seems to me that for developing a youth into a vigorous, hearty, healthy man, we have a better method than the military; and given the well-formed man the making of a soldier of him is an easy matter; while to reverse the process and expect to find the well-formed and healthy man among the drilled men of our companies might result in disappointment; as a recent report of a Secretary of War (1884) says, in speaking of West Point Military Academy: "These young men having been admitted enter upon a course of education, military drill and training and physical development lasting, with little intermission, for 3½ years." No tobacco or stimulants are allowed, yet "55 per cent. fail to keep on with the class." Yet the curriculum is not severe when compared with the courses laid out in our colleges, and the methods of this school are the model for all military schools. The system fails for the young. It is tolerably satisfactory for the mature.

MR. C. RATHMANN'S ADDRESS.

It seems strange that in the last quarter of the nineteenth century it should be necessary to discuss the advisability of completing and perfecting our educational methods by something which, two thousand years ago, the Greeks and Romans thought indispensable to a wholesome system of education. These nations owed their prominence among the people of that age largely to the recognition of the value of physical training. But modern educators have treated the body as of secondary importance, while teachers and parents have thought they could not begin early enough to fill the mind with all kinds of knowledge.

In the pedagogical and educational journals we rarely found an article devoted to the subject of physical training, and until recently among teachers the same indifference prevailed. I have attended County, State and National Conventions of teachers and tried to impress upon them the importance of bodily exercises in the public schools. Everywhere the answer was the same : "No doubt this is an excellent thing, and we ought to have it, but it takes too much time ; we are accused of overcrowding and overtaxing the child already. Moreover it costs too much." As to overcrowding the minds of the children, the charge is quite correct ; but could a better remedy be found than physical training ? Is it not the best recreation ? In the school with which I am connected, the pupils after calisthenics are fresh and attentive, and take up mental work with alacrity.

The desire for bodily exercises in youth is so strong that the attempt to suppress it will only strengthen it. Common-sense teaches us to satisfy this desire, and suggests a systematic training as a means of directing the uncontrolled energies in the right path. The exhibition here a year ago of girls trained in the New York Turnverein must have convinced every one of the superlative advantages of such discipline Indeed, I overheard remarks of ladies around me, who said, "Oh, could my daughter have enjoyed such advantages at school!" Compare these girls with some in our high schools who study Greek, Latin, Algebra and Geometry, but do nothing as to bodily training. Will the neglected body, at whose expense this one-sided education is carried out, be able to sustain the pressure? If we violate nature she will take revenge. It must come to this: the school that does not give the same attention to the physical development of its pupils as to the intellectual, cannot be thought worthy of our support.

The prospect of accomplishing this end is becoming brighter. Physicians, teachers and other friends of education are co-operating with us. In many places the study of gymnastics has been incorporated into the work of the public schools. Recently Denver, Louisville, Cleveland and other cities have introduced it.

The success and satisfaction are so great that some of the superintendents in their annual reports affirm that they do not see how the schools could have done without this training. Mr. Howland, Superintendent of Public Schools in Chicago, says in his last report: "During the year, as an experiment, a teacher of physical culture was employed to give instruction to the grammar grade pupils in four schools. The experiment was so satisfactory, that at the close of the year it was decided to employ for the present year eight teachers, who should give lessons twice a week to all the pupils of grammar grades in our schools. The good result of their training is already, at the time of this writing, plainly perceptible. It should be extended, I think, to the primary grades. No action of the Board, it seems to me, has been more wisely taken than this of an efficient system of Physical Culture."

And this is not the opinion, merely, of one but of many. The day must come when it will be the opinion of all. The freshness and vigor of the body facilitate every mental exertion, and promote cheerfulness, self-reliance and courage. Such conditions favor the growth of everything that is good, noble and pure.

This is the education that we must give. It offers the surest guaranty, not for the welfare of the individual only, but for that of the nation. A country like ours, ranking among the first on the globe, extending from the Atlantic to the Pacific—a nation which has shown to the monarchies of Europe that she can uphold a Republican government—must take care that her schools so educate young men and women that they shall graduate sound in body as well as cultured in mind.

THE MILITARY DRILL.

By John S. White, LL.D.

The only objection of any force which has ever been brought against the military drill as a means of physical exercise, is that it tends to produce an unequal development of the two sides of the body, while, on the other hand, a hundred advantages exist which no other form of exercise presents, or presents to the same degree. In the country, where the facilities for out-door exercise are great, the military drill may not offer superior claims; but, for boys, and we might also say girls, in city schools, no other single exercise gives the same variety of training or accomplishes the same results so speedily. Of course the fact is patent to every one that a thorough training in military drill will secure a better carriage and more manly bearing than any less regular and systematic exercise. I speak now of military exercises in general. Of course the tactics of various systems differ very much, and there are several points in which the system of "Upton's Revised Infantry Tactics" are defective, and not adapted to secure the best physical development in the soldier in actual service. In other words, the objection that the drill produces an unequal physical development is well enough founded, where it is not possible to adjust the exercises to secure evenness of growth, as we can, and do, in the schools. Several of the positions taken in the handling of the piece are unphysiological; among these are, for instance, "carry arms!" in which the piece is held in the right hand, the lock-plate grasped by the fingers, and the weight of the piece falls directly upon the right shoulder; the "support arms!" in which the piece is supported upon the left fore arm by the hammer is not only an impossible position for any number of men in line to secure correctly, because of the difference of their physical formation, but is a dangerous position for a soldier to hold his piece in, when under fire—for a stray bullet, striking the barrel of his musket, would, in nine cases out of ten, break the bone of his left fore-arm; also "right shoulder arms!" with the cramped position of the wrist and hand without the opportunity for relief of the "left shoulder shift" which is given in the old "Hardee's Tactics," cannot be correctly maintained for any length of time without great fatigue. All of these, I contend, are accidents of our imperfect tactics and not essential parts of the manual of arms in the military drill.

They are simply adaptations to the handling of a musket which our government happens for the time being to be using. Most of the rifles in use in the different countries in the world have no hammer, and in the Martini-Henry rifle practice and manual the positions of "carry" and "support arms," as provided for in the Upton tactics, are simply impossible, from the fact that the gun is a hammerless piece. At the annual exhibition drills of the Berkeley school in 1885 and 1886, it was our privilege to give an illustration of the infantry tactics used in the English service, adapted to the Martini-Henry rifle, with the view of showing how completely the only objections now presented to the military drill would be removed by the adoption of this hammerless piece, and how evenly both arms and both shoulders were exercised, to say nothing of the greater facility and speed with which a body of men could be put in marching order from a halt than is possible with the Upton tactics. A single instance will suffice to illustrate this. Let us suppose a regiment of men in the field, held in reserve, standing at order arms. The enemy are in front and making an attack; they are gradually getting the advantage; the order is given to the reserve to hasten with the utmost speed to the rescue. The commands necessary to put the regiment in motion, in our own tactics, would be, "Battalion attention, carry arms, right shoulder arms, forward, double time, march!" necessitating a loss of several seconds of time, which, in many such instances would prove disastrous. The command in the other tactics would be simply; "Forward, double time, march!" the piece being thrown at the first step by a simple motion of the right hand, into the position of "trail," which in the Martini tactics is the easiest possible position in which to carry a gun, namely, horizontal, and balanced in the hand as a fisherman would carry his pole at his side. At the command "halt!" the piece is brought to the position of "order arms!" without further direction. Not to go into particulars, the tactics to which I have just alluded, approach more nearly to the utmost simplicity, convenience and comfort of the soldier than any other system that has been invented. Yet, even with our own defective system as it now exists, it is possible for the judicious instructor to accommodate the exercises in such a way to the needs of the men under arms that evenness of development can be most perfectly secured.

The efforts which have been made to depreciate the military drill as a means of physical education are more amusing than dangerous. Professor Hartwell of John Hopkins University, in his admirable pamphlet upon physical training in American schools and colleges, takes the ground apparently, that calisthenics and military drill are necessarily set in opposition to each other. He seems to think it impossible for one institution to use both methods of physical training. His line of argument reminds one forcibly of some of the questions for debate given to the candidate for admission in the exercise of initiation to the college societies; as, for example, "Which do you prefer, soup or dessert?" It is by no means necessary in any system of education that one of these means should be adopted to the exclusion of the other. In our own institution they occupy equal amounts of time and we consider them equally valuable. With a large gymnasium, equipped with the best possible appliances, we should be loth to give up one moment of time which we devote to the military drill. The opponents of the drill, argue frequently from wrong premises; as, for example, that the muskets are too heavy; that not sufficient variety of exercise is introduced, etc. Like the question of the tactics these points are very readily adjusted; the muskets for boys from 15 to 18 years of age should not weigh over 4½ lbs.; and, for ages under 15, from 2 to 3 lbs. And the variety which may be attained in the military drill in a correct and progressive system is something marvelous to the uninitiated.

PAPER BY DR. H. M. STARKLOFF,

President North American Turner Bund.

Germany in the year 1848–49 was a caldron of political ferment and excitement. The yoke of thirty-four monarchs became too heavy even for the most patient German, and in all parts of Germany revolution was ripe and bursting into lurid flames.

Unfortunately the liberty-loving elements lacked that organization and unity which are so essential in a battle with well drilled, organized armies; hence the revolution was a failure and its brave promoters were incarcerated, persecuted and driven from house and home, wife and children. Thousands came to the hospitable shores of the United States to find an asylum, not with the idea of making this their future home, but only as a temporary refuge from whence they would return with new ardor to the Fatherland to renew the battle of liberty against despotism.

But things turned out differently for them. The grand period through which they lived and acted had wrought their forces up to the highest tension, and excited in them fervor which inspired them with the loftiest ideal conceptions. That the practical, conservative American could not understand the emanations of such an inspiration is easily comprehended; although inclined in favor of the strangers, he for a long time was uncertain what to think of them. Their language, their manners, their ideas were so different from his. Hence, under these circumstances the Germans withdrew within themselves, gathered closer together, and formed associations of their own, of which the Turner Societies played a most prominent part.

They had their Turner Campos. They built Turner halls for their meetings, which soon became the center for their gymnastic exercises, for their pleasures and also for the discussion of their ideal aims. In these Turner halls thousands of Germans were converted into good American citizens, for they soon discovered that this was the free country which had been their ideal, and that here they had found what they had been seeking for in the old Fatherland.

With the diminished interest in the old country grew their love for the land of their adoption, and the Turner halls soon became the schools for the diffusion of knowledge of American politics and political economy. Thus German Turners became American citizens, and soon the Turner Bund made it obligatory that every one of its members should declare his firm intention to become an American citizen.

However, political and ethical motives were not the only ones which incited to build Turner halls It is a remarkable feature of the era in which we live, that everything is treated scientifically and pressed into the service of mankind. The learned professors do not now cloister themselves, but form part of the people and adapt the results of their scientific researches to the wants of the people. In this way has that most important science hygiene affected the masses ; a science which is destined to remove many a devastating plague and promote health and comfort, a most beneficent result.

If one would enjoy uniform and perfect health it must be by judicious exercise of all the bodily organs, and nothing contributes so much towards that as systematic gymnastics. Even if we are not able to banish all ills from our midst, we can certainly limit them to a great extent. We are to impress youth with a love of nature and with a keen relish of bodily exercise, and so make them joyous, temperate, self-controlled and self-reliant men and women.

Based upon such principles, there were formed Turner Associations in almost all large cities of the United States, who, by degrees, united in one union, under the name of North American Turnerbund.

Besides the bodily exercises, they held at their meetings debates and lectures on religious, social and political questions. The progressive and positive attitude of the Turners made them soon many friends. On the other hand, and for the same reasons, they were hated and persecuted, and fanatics of all kinds caused them many disagreeable difficulties. But as the strong and the brave get new strength and new courage under oppression, so the Turnerbund attained more weight and influence. Their efforts in the field of gymnastics and in athletic and social questions were recognized and acknowledged, and their festivals grew in favor. At these festivals prizes were distributed to those who excelled in bodily and mental exercises.

In this manner the Turnerbund flourished from year to year until the breaking out of the civil war in the year 1861.

Hardly was the first call issued towards the formation of a volunteer army, when the Turners presented themselves almost unanimously to be enrolled as defenders of the Union, and here it was, where the Turners practically showed their love of their adopted country. With their blood they sealed their love on many a battlefield. Thus, under these circumstances, the Turnerbund was soon a thing of the past. There was hardly an able-bodied Turner to be found in the Eastern, Western and Northern States, who had not worn the uniform of a United States soldier. When the war was over, the Turners, those of New York at the head, came together to reorganize their Union. They succeeded admirably, and upon a broad progressive platform the Union visibly grew in strength, so that in the year 1868 it counted 148 societies, with 10,200 members. The bodily exercise turning, was partially directed by teachers educated in Germany. The foremost Turners of each society, showed on the whole more enthusiasm for the exercise than actual knowledge, so that the want of good teachers soon made itself felt. The Turnerbund, therefore, resolved to found a seminary for the purpose of educating superior teachers of gymnastics. This is yet flourishing and has proved to be all that could be expected. A full report of its work and present condition was read here last year by Mr. Rathmann of St. Louis.

Since the founding of this seminary the Turnerbund has increased rapidly. In their conventions the question soon was agitated, how to make the German system of gymnastics a feature of American education by introducing the same into the Public Schools as an obligatory course of study. In this plan the Turnerbund has succeeded in the following cities: Chicago, Cleveland, Denver, Davenport, Louisville and Omaha, and the benefits derived from it are remarkable. Many other cities would have followed the example long ago, but want of money and want of proper teachers have so far made it impossible.

The National American Turnerbund consists to-day of 26,722 members in 237 societies, allotted to 31 circuits. There are 18,888 children of both sexes who receive the benefit of gymnastic teachings in these societies. There are 104 teachers, alumni of the seminary employed, and 606 assistant teachers support them in their arduous labor; also, 144 Turner Societies have built up their own halls, which, in connection with their gymnastic apparatus, represent a capital of three million dollars. Many societies are in possession of extensive libraries.

In addition to the gymnastic exercises, fencing and target shooting is also practised. Almost every Turner Society has a corps of singers who add to the amusement and promote the refinement of the members. Once a week, besides the school gymnastics they have at their campos free exercises; and every circuit appoints two evenings in each month where all the societies of the circuit have to meet, and participate in the gymnastic exercises.

The great loss of life in the conflagration of the Southern Hotel in the year 1877, and the insufficiency of life apparatus by the fire department, caused Mr. Toensfeldt, a member of the St. Louis Turners, to take steps towards the introduction of a more sufficient life saving corps. Twenty-four Turners formed themselves into two companies. They studied in a practical manner, what is here generally called by the French appellation—the Pompier service. They gave their first exhibition on the 18th day of June, 1877. The Common Council of St. Louis in its next session unanimously accepted this system as part of the public fire service, organized two companies of firemen, supplied them with the necessary apparatus, and had them instructed in the use of it by a Turner, Mr. Toensfeldt.

Since then this system has been introduced in many large cities of the United States, and many a life has been saved by it. In many cities the Turner teachers are yet laboring for a more general introduction of the Pompier service; and last summer at the meeting of the National convention of the Turn Teachers, held at Cincinnati, all its members were made familiar with it.

In many Turner societies the older members, from 30 to 50 years of age, formed coteries of their own; they turned out twice a week, an action which deserves general imitation, for it is not only necessary to render the body healthy while young, but it is far more important to preserve it strong and vigorous; and still more so in times when our mental and nervous activity is wrought up to its highest tension, and when all kinds of vehicles and instruments like telephones supersede bodily exertion, proper gymnastics are doubly required.

The literary man and the merchant are tied to their desk or office, and the workman is confined to his workshop or factory, using but the minimum of his muscular apparatus. Each would do well to devote some time each day to develop his entire organization to prevent the degeneration of any one part. In addition to the lungs, there are about 500 muscles needing regular exercise to prevent their relaxation.

The American nation, which, through a happy concurrence of circumstances and through restless activity has attained great wealth, is in danger of falling into the habits of free living, luxury and indolence, which will result in physical degeneration, not only for himself but also for his descendants. We say "time is money," but money is not everything. Better a vigorous body with but little money than millions without health.

I have thus given in a condensed form the purposes and methods of the North American Turner Bund. I firmly hope that our mutual endeavors will be crowned with success and will be a blessing to the nation. When last year you issued your invitation to the Turner Bund to send delegates to your Convention, we availed ourselves of the occasion with great satisfaction, because we saw in it a great advance for our cause. I trust confidently that such expectations will be realized, and, believe me, any proposition coming from this Convention looking towards a higher efficiency of our system of physical culture will be accepted joyfully. I am also convinced that your new body would adopt any valuable feature in our system with the same feeling, for to be useful to mankind is the mutual aim and end of both of our organizations, and to find the best means of its realization is the purpose of our meetings.

REMARKS OF W. L. SAVAGE, M. D.

The greatest step in the department of Anthropometry I consider to have been taken two years ago, at the first meeting of this Association, when a committee of three, Drs. Hitchcock and Sargent—pioneers in this noble work, who are beginning to see some of the fruits of their life-long labors—with Dr. Anderson, met at Cambridge to draw up a system of measurements which should be adopted by all. The great advantage of this is readily seen. We formerly were struggling along in independent lines, each recording a few scores of measurements annually and waiting for years to gather together a sufficient number to begin to draw conclusions. A lifetime, working alone, would not give us enough measurements to establish such laws of relation of parts as would be of any great value to science. Now, by a general adoption of its report thousands of measurements are yearly collected and we thus reach the average or typical mean man for any given height, and the correct relation of the various parts in the symmetrical stature.

This report was laid upon the table for one year to be taken up and formally adopted at this meeting, giving us the intervening time to test and make any changes that such a trial might suggest before being passed upon. We are too busy men to be wasting time taking and recording measurements which can be of no value when obtained, or so unreliable that they become worthless. Hence we should not treat this matter lightly. The so-called test for *Strength of lungs* is not a lung test, but may be either a test of the expulsive power of the diaphragm and muscles of the chest, pharynx and cheeks. Dr. H. says that he has followed the system of measurements essentially as laid down in the report of the committe, omitting those of the feet. Instead of giving up the latter I would add more, namely, the length of the heel. This would be virtually giving us two important measures by simply deducting the length of heel from that of whole foot and we would have the length of two very important levers used in running, walking and jumping. With the same instrument used for measuring the foot, measure from the lowest point of the extreme maleolus to the back part of the heel at an equal height from the floor.. Great attention should be paid to the examination of the heart and lungs and specific instructions as to the instruments used should be given, as in examining the eyes and ears. The games, sports and feats in which a pupil excels should be noted, (*Vide* Dr. Sargent's suggestive papers in *Scribner's Monthly.*)

Having the relation of the parts to each in the average man and noted the difference between these measurements and those of men distinguished for special feats, one finds an explanation why one man excels another, both having equal advantages as to training. Thus it is not the attachment of muscle upon the bone as has been suggested, nor the amount of muscle developed by this or that one, but rather the relative length of the various bones, other things being equal, which gives a longer or shorter lever. Hence, we have given the relative length of the bones to each other, and the relation of the muscle upon these bones to the length of the levers, and we now can more accurately define the condition and prescribe the work for the individual under consideration.

This is what Anthropometry is doing for us. It gives a standard and reduces to a positive knowledge what before was merely impressions as we looked a man over. We measured and prescribed in a general way. Years elapsed before we saw enough to give a fairly good judgment. Now we are enabled to foretell the ultimate result of training with greater accuracy. Anthropometry now seems to be doing more to reduce this work to a positive science than any other single branch of the study. The greatest care should be taken in collecting and recording results and deductions which may be of positive scientific value to those coming after us. The more intelligent our study and physical care of the people is, the stronger, healthier and more vigorous will the race become.

PHYSICAL MASUREMENTS, FALLACIES AND ERRORS.

Dr. Edward Hitchcock.

Some of us thought a few years ago, that when we had piled up a sufficient number of data, from our physical examinations, from which to make reliable averages, that the matter of directing our pupils or patients, as the case might be, to the end of securing for themselves a happy physique and a generous digestion, would resolve itself almost to a simple mathematical problem.

It was with great satisfaction, and with the object of finding a possible ultimatum to which to refer, that some years ago at Amherst College—under my father's direction—I assisted in making from the recorded measurements of something over six hundred students, a table. It was not expected that this table would be absolutely correct, but rather that it would be a stride in the direction of something absolute and reliable.

It was first attempted to make weight the basis for this table, the idea being that a law of averages would be found governing the whole, and that it might naturally be expected that as the weights of the individuals increased so also would increase all the other measures. Some weeks' labor showed that this hope was not to be realized in fact, and the law was not found. Another attempt, making height the basis, seemed to show not only that such a law exists, but that it turns on this factor of height. More recently published figures from Amherst, incorporating the examinations of over eleven hundred individuals, show conclusively, I think, that this is true so far as measurement made by the line, rod, calipers and spirometer are concerned. Beyond this, in some of the tests of strength,—certainly in those of the "pull" and "push up,"—no law governing them has to my knowledge been found.

The law broadly stated is that human measures increase with height, always understanding that the law will not include some of the tests of strength.

That the law should be discovered in this table with never a deviation was too good to be hoped, and in fact the deviations were there, but always so slight and with the presence of the law always so prominent, that the slight changes necessary to make an individual item conform to the law, were very permissible.

It is with the aid of such tables as these that we can now, in the case of a college student, knowing his measures according to the plan adopted by this association at its last meeting, tell him whether he is above or below the averages of measures of men of his own height, and also how much he is above or below,—and we are only waiting the publication of statistics from our colleges for women to be able to afford the other sex the same information. But this will not be enough, for we have no right to rest until we know these same facts about people of all ages and from all conditions of life, and it is much to be hoped that very soon we may have these facts from those in whose hands they lie.

Now, having these averages on the desk, it would at first seem to be a very simple affair, a mere matter of comparison, to tell an individual whether he is larger or smaller than the average man of his own height. Easy as such a comparison would seem it still is full of difficulties, some of which appear almost insurmountable, if we are seeking for exact results.

These difficulties are, first, the almost practical impossibility of taking some of the most important measures, as for example the girth of chest either expanded or at repose, the lung capacity, or almost any of the tests of strength,—the almost practical impossibility of taking them twice in succession for the same individual and securing exactly the same figures for a resultant.

To illustrate more clearly what I mean, let me give an example or two. Before me, while writing, are the measures of a gentleman, who tried as best he could to offer me the same condition at each measurement taken. Two trials with the tape about his expanded chest give a difference of nearly three-fourths of an inch, —while the chest at repose shows a still greater variation. The biceps is a variable quantity to the extent of a quarter of an inch, and the two breadths of shoulders fail to correspond by almost a third of an inch. In another case, the capacity of lungs differs in two trials nine-tenths of a litre, and in the test of strength of legs three trials in moderately quick succession give the rather astonishing results of, first trial one hundred and sixty kilos, second trial one hundred and ninety, and in the third two hundred and forty—a difference between the first and third trials of one hundred and seventy-six pounds. In this case the trials were made by a man who did not know the reason for asking them, and, expecting to be asked to make but one attempt, evidently tried to do his best at each effort. That the differences in this latter case are excessive and unusual is admitted, but the former is exactly similar in kind to those which we constantly meet in the examining room. And moreover, such differences in kind and perhaps degree would be found in every case if we were to repeat the examinations.

When we come to compile these examinations, and from a large number of data get their averages, the errors are largely corrected and the results arrived at practically correct; but we are interested in the application of our work to the *individual*, and to apply it to him with anything like correctness it would seem desirable in every case to make a large number of measures of all of the most varying parts, average them, and compare those results with our grand averages.

This then is the first difficulty we meet, to make our examinations sufficiently accurate so that we can always closely approach the truth.

If these inaccuracies show up so plainly in the cases of individuals whom we ourselves examine, how much greater will be the complication when we attempt to diagnose for a person whom we have never seen, on the basis of an examination made by another person. That this has been done, and perhaps with benefit to the person examined, we all know; but how it can be well done, is one of the things not easily understood, for it is very certain that if a half dozen examiners should examine and record the measurements of an individual, no two of the records would agree, and in some cases, for example the chest or shoulders, not even within reasonable limits.

And again, an even more serious reason for not accepting the measures of a person whom we have not seen, made by some examiner other than ourselves, is the entire absence in such a case of what may be called the personal element, or equation. It is something not easy to describe, for it can neither be measured nor tested; it does not appear in the history of the individual nor is it revealed by the stethoscope or palpation. It is the *personality* of the man, and is found in the brightness of eye, quickness of speech, promptness of muscular response, fineness of skin, and rapidity of perception. It is an indescribable something without which it seems to me one should be as unwilling to advise an applicant as a physician would be to treat a stranger fifty miles away, sick with pneumonia. Attempting to do it, I should feel very much as I fancy a clairvoyant does when hunting over her stock of photographs (after having received by mail your dollar and your lock of hair) to find a picture which represents your future wife or husband.

Another trouble that met me until I gave up the attempt to secure the item, was what seems to me to be the entire unreliability of the test of "Strength of Lungs." Not because it does not test the strength of lungs,—for nobody I suppose ever thought it did,—but because it is not constant in its test of any muscle or any set of muscles. That is, while one individual uses the instrument as it is intended he should, making tense the diaphragm and bringing to bear on the chest walls its expulsive muscles, the next individual closes his epiglottis and, with the muscles of the pharynx and cheeks, expels into the machine the air from the mouth only, and experiment has shown that while in the former case the best results are obtained—as would be expected—when the lungs are fairly well filled, in the latter it makes little or no difference with the result whether there is anything more than the residual air in the chest. If this is true, that the test is unreliable in that it may operate upon the thoracic or pharyngeal muscles according to the individual peculiarity of the examined, then the final computation of the "Total Stength" must also be wrong, for which reason I no no longer attempt to find it. In this connection,—speaking of the unreliability of some of our measurements,—it is interesting to note that in France, Germany, Spain, Italy and Denmark the police have adopted a system of bodily measurements to assist in the identification of persons who have once been arraigned for crime. This system does not include any of the muscle measures, because of the difficulty of getting them accurate, and because of the changes muscle undergoes. The measures they *do* take are such as the length and breadth of head, length of ear and foot, length of the middle fingers of both hands, and the sitting height. Thus, while an adult criminal might so distort his features as to make a photograph of but little avail in a subsequent attempt to identify him, he will find it more of a trouble, practically an impossibility, to change the measures of his head, ear or foot.

In conversation a few days since, with a man most eminent in physiological and anthropometrical work, and whose contributions to our literature we have all read, it was interesting to hear him say that an attempt to measure the chest struck him very much like attempting to measure an inflated balloon, the size of which varies with every change of barometer and thermometer.

We have received with pleasure and examined with interest the "Anthropometric Chart," which has come to us from the Hemenway Gymnasium within the past few weeks. It is to be regretted, however, that the chart shows none of the figures on which it is based, for there are many of us who have been eagerly waiting for the publication of those figures, hoping when they did appear, they would help clear away some of the obscurities in which many of us, less fortunate in our opportunities for observation, and with fewer subjects for examination than are presented at Harvard, have been working.

The red line across the chart is attractive, interesting and withal somewhat puzzling, and I am very anxiously hoping for the appearance of a second, following chart, which shall show us the figures that same line cuts in its devious path across the sheet. There is however, an objection to this little line. It looks like a very honest line as it goes straight from point to point across the page, but I cannot believe so much in its absolute correctness as I wish I could, and for the reason given before:—the practical impossibility of securing the measures with accuracy. It seems reasonable to believe that if six examiners should measure a man and send the results of their examinations to the Hemenway for plotting on a chart, there would be returned to them not one little line, but several, in the spaces allotted to many of the items. This is not said in the way of condemning the chart, but is intended to still more forcibly urge what has been said before, that our science thus far is anything but exact.

In this connection, perhaps a suggestion of another method for the graphic delineations of such physical examinations as we are making will not be out of order. It has in it all the inaccuracies of which I have spoken, and those which I believe must exist in the Hemenway Chart, but it has some advantages which perhaps would make it of more practical use, in that it would show to the individual the average of measures for all the items for men of his own height, and moreover, would compare them with the measures of the "typical" or average man.

This is a table giving the average measures for men of all heights, by centimeter gradations, from 155 to 185 inclusive. Now with a pen stroke, or by a heavier faced type, indicate the measure of the typical man, while another ink line would point out the measure of the individual as recorded.

The chart is far from being correct, and is shown rather to illustrate a method than to exhibit results. One deficiency of the table is in the "adjustment" of the measures. Thus far I have been unable with the comparatively small number of records at my disposal, to satisfy myself whether or not the increase in the individual measures as we advance up the scale of height, is that of a steady, regular increment, or whether it be more or less variable. Again, in attempting to plot on such a chart an individual's record, it will be impossible, in case of all the items, to find the *exact* number sought, so that we should have to approximate the truth by taking the nearest number which appears. This sounds like more of an objection than it really is, for at most, the difference could be of but a few millimeters, and a moment's study will show how it is possible, by a change in the table, to so arrange it that the exact number required in any case can be found there.

The advantage some such a table as this would have over the Hemenway chart is that it shows the actual figures,—so far as we know them—of the measures of the "Typical" man, the averages of measures for men of all heights, and places them for comparison over against the measures of the individual examined. In the Hemenway chart the applicant only learns that he has a *fractional relation* to the "Typical" man without any information being afforded him as to what the "Typical" man is.

There is a tendency in this compiling of statistics, to be in too great haste for results,—a desire to see shown on paper what our work has accomplished; and so we find in the course of a year, compiled by different examiners, a number of averages and means either for a period of time too short to give useful information, or else made from too small a number of data.

While it is true averages do eliminate many errors of recording, etc., it is only true when we add that the averages must be made from a great number of items, and the greater the number, the more accurate the results.

Another evil which sometimes creeps into the work is that of the personal bias of the examiner. A wish on his part to show some particular thing,—to prove physical superiority of his pupils over those of some other investigator, or to show rapid growth and development. There is nothing more injurious to results than such a spirit. The only figures of value, are those resulting from long, patient, careful research, where the worker has no theory to prove, but only strives to collect and tabulate the nearest possible approach to the facts, regardless of what theories those facts may overturn.

Now what has been said in this paper concerning the relation of examinations to the individual, was intended to be, in part, a sort of criticism. Not a criticism arising from egotism, for nothing has been said here which will not occur to any one looking into the matter. Neither does it arise from a wish to condemn our system,—which is undoubtedly the best thing, thus far, our science has been able to put into our hands,—but rather in the direction of emphasizing some of our weak points, and in the hope of stimulating some anthropometric genius to indicate a way out of the existing difficulties, and tell us how we may with greater accuracy measure the *vital capacity* of a man. And it is further intended as a caution, that in the advice we are called upon to give, we do not place too much dependence on what our measuring apparatus tells us of the individual. To my mind a good judgment without the record of measurements, is far more useful, and perhaps more correct, than would be the measurements without the judgment.

The measurements are efficient but not sufficient, and the danger lies in placing too much dependence on them.

REMARKS OF MR. CARL KROH.

Dr. Starkloff has referred to the Turners' organization, and my colleague Mr. Rathmann has urged the introduction of a system of physical education in the schools of the land. For the first time, it occurs to me, we record the fact that we, as true representatives of what is needed in the schools of the land, offer to co-operate with one another. Many of us for years have endeavored to impress upon the the public mind the importance of physical with mental training. Our Bund has been tireless in its efforts in this direction these twenty-five years and more. Why are these efforts so ineffectual compared with other efforts pertaining to education ? Why are we so slow to adopt what is conceded to be the best ? Because of the lack of co-operation. Gentlemen who have extensively travelled in the older countries, and have seen the advantages for youth of a harmonious mental and physical education, have endeavored to imbue the right spirit, and they have unhesitatingly declared that the system of Physical Education in vogue in the older countries deserves introduction in the schools of this country. Why not ? Do our out-door sports suffice, or our many gymnasiums, where one follows his own inclination, often without proper guidance ? Shall all the valuable information printed, the advice of experienced teachers, be unheeded because we prefer to experiment ? Recall the testimony we have heard from Boston as to the one-sided military system, a substitute for physical training in vogue in that city. Hear the praise of the foot-ball game and draw your conclusions when you read the number of wounded men. Listen to Dr. Sargent, who would adopt a system of physical training that could answer all requirements only after having found the Typical man.

The German system has been established now for over fifty years and built up by the genius, industry and experience of a century. It covers all the ground. But how shall these benefits be secured? Our esteemed Secretary, Dr. Anderson, has said: "I regard the German system as the best." He attended the convention at Cincinnati last summer, and expressed the desire to get hold of the entire nomenclature of the German system. We have not, according to our views, an English nomenclature that does justice to the system. We agreed to select a committee for this purpose, and found it a very trying task. A number of German teachers answered the circular of our committee, containing a number of the most interesting terms, that are not readily translated into English language.

In case the printing of a manual or guide should be decided upon I trust that terms will be adopted which will last. It is necessary that a popular nomenclature be established. The works we have are of the descriptive order. What we want are terms that will in the shortest possible manner indicate what is wanted, words that can be embraced in a command. The German nomenclature is admirable in this respect, a great number of exercises being given with few words, that would require for description whole sentences. A hand-book, published here, with popular terms, would do much to acquaint gymnasts with the system in question. I would propose that our Technical committee of the Turners be asked to co-operate with a like committee of this Association in the revision of such papers as can be gathered during the coming year from proper sources, with a view to publishing a hand-book for class-leaders, such committee to report at next session.

ANTHROPOMETRIC MEASUREMENTS.

Dr. Fremont Swain.

In order to make measurements of the human body with accuracy and dispatch, certain tools are essential. They are:

1. A pair of scales, which should be of the ordinary platform type. The beam should stand about 4ft. 6 in. from the floor.

2. A measuring rod. There are two very good forms; (*a*), The fixed rod, mounted on top of a box about a foot high, and held firmly in a vertical position by an iron brace. A movable slide

carries an arm perpendicular to the rod. 1 1-4 inches square is a desirable size for the rod. (*b.*) The movable rod, jointed in the middle, 5-8 or 3-4 inches square and 6 or 7 ft. long.

3. A tape 1-2 or 3-4 broad. The best ones are made of rubber.

4. A width measure, 24 or 36 inches long, 1-2 inch square.

5. A pair of calipers. 6. A hand dynamometer. 7. A leg dynamometer and attachments.

8. A lung dynamometer or monometer. 9. A spirometer.

10. A box 10 to 14 inches high. 11. Measurement blanks.

Nos. 5, 6, 7, 8 and 9 are made in approved forms by T. A. Upham, Harvard Place, Boston. No. 11 should consist of cards; the form annexed is probably as desirable as any. The graduations on these instruments may be made in two approved forms:

1. Metric graduations. 2. Graduations consisting of inches and tenths, and pounds and tenths. Both forms can be put on the same instruments at a slight extra expense.

Number.—If desirable to secure privacy, the individual should be entered in the record by number. As a means of identification, the number can be entered in an alphabetical index book opposite the corresponding name, as Smith, John H. . . 526.

For further convenience it is advisable to enter the name in a numerical index book opposite the corresponding number, as 526 . . John H. Smith.

Date.—Record the year, month, day and hour, as: Jan., '86, 12, 9 A. M. Where perfect accuracy is desired, note should be made of the time that has elapsed since eating, the occupation of previous hours, and of the temperature of the room.

Age.—Record years and months, as: 21–9, *i. e.*, twenty-one years and nine months.

Weight.—The weight of the body should be taken without clothes. Where this is impracticable, the weight of the clothes should be deducted.

Height.—The height should be taken without shoes and with the head uncovered. The head and figure should be held easily erect, and the heels together. This position is best secured by bringing the heels, the buttocks, the spine between the shoulders, and the back of the head in contact with the measuring rod.

Height of Knee.—The subject should place one foot on a box or chair of such a height that the knee is bent at a right angle. A box about 12 in. high is suitable for adults. Press a ruler upwards with a force of about one pound against the ham string tendons close to the calf of the leg. See that the ruler is held in a position at right angles to the vertical rod, and measure the height of the top of the ruler from the box.

Height Sitting.—Let the subject sit on a hard, flat surface about 12 inches high, such as afforded by a box or chair, with the head and figure easily erect so that the measuring rod will touch the body at the buttocks, between the shoulders, and at the back of the head. Measure the distance from the box to the vertex.

Height of Pubes.—With the subject standing easily erect on the box or floor, measure up to the lower edge of the pubic bone.

Height of Crotch.—With the subject standing easily erect on the box or floor facing the vertical rod, press a ruler firmly against the perineum (crotch) and measure the height of the top of the ruler.

Height of Navel.—With the figure and head of the subject erect, measure the height of the centre of the cicatrix.

Height of Sternum.—With the figure and head of the subject erect, measure the height of the interclavicular notch.

Height of Ears.—With the head erect, measure the height of the centre of the external meatus.

Girth of Head.—This measurement should be taken around the head with the tape at the upper edge of the eye-brows, over the supra orbital and occipital prominences. All girths should be made on the skin itself and at right angles to the axis of the body or limb at the point of measurement. No oblique measurements are taken.

Girth of Neck.—With the head of the subject erect, pass the tape around the neck half way between the head and body, or just below the "Adam's apple."

Girth of Shoulders —With the arms hanging at the sides and the chest in the condition of repose, measure the girth of the body passing the tape around the shoulders at the centre of the deltoid muscle, which in adults is about two inches below the point of the shoulder.

Girth of Chest.—Pass the tape around the chest so that it shall embrace the scapulæ and cover the nipple. The arms of the subject should be held in a horizontal position while the tape is being adjusted and then allowed to hang naturally at the sides. Take the girth here before and after inflation.

Where it is desirable to test the elasticity or extreme mobility of the walls of the chest, a third measurement may be taken after the air has been forced out and the chest contracted to its greatest extent. To test the respiratory power, independent of muscular development, pass the tape around the body below the pectoral line and the inferior angles of the scapulæ, so that the upper edge shall be two inches below the nipples. Take the girth here before and after inflation.

Girth of Waist.—The waist should be measured at the smallest part after a natural expiration.

Girth of Hips.—The subject should stand erect with feet together. Pass the tape around the hips above the pubes over the trochanters and the glutei muscles.

Girth of Thighs.—With the feet of the subject about six inches apart, the muscles set just enough to sustain the equilibrium of the body, and the weight distributed equally to each leg, measure around the thigh just below the nates.

Girth of Knee.—With the knee of the subject straight and the weight of the body equally supported on both legs, measure over the centre of the patella.

Girth of Calf.—With heels down and the weight of the body supported equally on both feet, the tape should be placed around the largest part of the calf.

Girth of Ankle.—Measure the ankle at the smallest point.

Girth of Instep.—Measure around the instep at right angles with the top of the foot, passing a point at the bottom of the foot midway between the end of the great toe and the back of the heel.

Girth of the Shoulder.—With the elbow slightly extended from the side, pass the tape under the axilla and over the acromion, and measure the shoulder perpendicularly.

Girth of the Upper Arm.—With the arm of subject bent hard at elbow, firmly contracting the biceps, and held away from the body in a horizontal position, pass the tape around the greatest prominence. If desirable to find the girth of the upper arm when the biceps is not contracted, the arm should be held in a horizontal position and measured around the most prominent part.

Girth of Elbow.—Taken around the internal condyle of the humerus while the arm of the subject is straight, with the muscles of the forearm relaxed.

Girth of Forearm.—Taken around the largest part. The fist should be firmly clenched and the palm of the hand turned upward.

Girth of Wrist.—With the hand of the subject open and the muscles of the forearm relaxed, measure between the styloid process and the hand.

Girth of Hand.—With the hand extended, measure its girth at a point midway between the thumb and the knuckles, not including the thumb in the tape.

Depth of Pelvis.—Place one foot of the calipers on the centre of the pubic bone, the other at the top of the inter-gluteal fold.

Depth of Abdomen.—Place one foot of the calipers immediately below the navel, the other on the spine at such a point that the line of measurement is at right angles to the axis of the spinal column.

Depth of Chest.—Taken with the chest in repose, place one foot of the calipers on the sternum, midway between the nipples, and the other foot on the spine at such point that the line of measurement is at right angles with the axis of the spinal column. When it is desirable to ascertain the extent of the antero-posterior movement of the chest, measurements may be taken from the same points after the fullest inspiration and after the fullest expiration.

Depth of Neck.—Measure the antero-posterior diameter of the neck midway between the head and the body.

Depth of Head.—From the supra-orbital ridge to the occipital prominence, *i. e.*, the greatest antero-posterior diameter of the head. Both this measurement and the depth of the neck are most conveniently taken with the width measure.

Breadth of Head.—The breadth of head should be taken at the broadest part. In taking the breadth measurements, stand behind the subject.

Breadth of Neck.—Taken at the narrowest part with the head of the subject erect and the muscles of the neck relaxed.

Breadth of Shoulders.—With the subject standing in a natural position, elbows at the sides, shoulders neither dropped forward nor braced backward, measure the broadest part two inches below the acromion processes.

Breadth of Waist.—Taken at the narrowest part.

Breadth of Hips.—Measure the widest part over the trochanters, while the subject stands with feet together, the weight resting equally on both legs.

Breadth of Chest.—Taken with the chest in repose, with the elbows slightly extended from the waist, place a foot of the width measure in the centre of each axilla. Measure the included distance.

Breadth of Nipples.—Taken from centre to centre with the chest in a natural position.

Length of Shoulder to Elbow.—With the arm of the subject bent sharply at the elbow and held at the side, measure from the top of the acromion process to the olecranon. Care should be taken that the measuring rod is parallel with the humerus and not with the external surface of the arm.

Length from Elbow to Finger Tip.—With the arm of the subject bent sharply at the elbow and the rod resting on back of the arm and hand, measure from the olecranon process to the tip of the middle finger.

Length of Hand.—With the hand extended, measure from the tip of the middle finger to the line or lines separating the palm from the wrist.

Length of Foot.—Take the extreme length of foot from the end of the first or second toe to the back of the heel, about one inch from the surface upon which the foot rests.

Stretch of Arms.—With the arms of subject stretched out horizontally so that both hands and shoulders are in a line, with one middle finger and the zero end of the measuring rod pressed against the wall, note the point to which the other middle finger tip reaches.

Horizontal Height.—With the heels of the subject pressed hard against a perpendicular wall, with the arms at the side and body resting naturally on a horizontal plane, measure the distance of the apex of the head from the wall.

Capacity of Lungs.—The subject after loosening the clothing about the chest and taking a full inspiration, filling the lungs to their utmost capacity, should blow into the spirometer until no more air can be forced out.

Strength of Forearms. Grip.—The subject, while holding the dynometer so that the dial is turned inward, should squeeze the spring as hard as possible, first with the right hand then with the left. The strength of the muscles between the shoulders may be tested with the same instrument. The subject while holding the dynometer on a level with the chest, should grasp it with the handles, and pull with both arms from the centre outward.

Expiratory Strength.—As before, the subject after loosening the clothing about the chest and filling the lungs completely, should blow with one blast into the manometer. Care should be taken that no air is allowed to escape at the sides of the mouth, and that in expelling the air all the muscles of expiration are brought into play. Two or three trials may be allowed.

Strength of Back.—The subject, standing upon the iron foot-rest with the dynamometer so arranged that when grasping the handles with both hands his body will be inclined forward at an angle of 60 degrees, should take a full breath and, without bending the knees, give one hard lift, mostly with the back.

Strength of Legs.—The subject while standing on the foot-rest with body and head erect, and chest thrown forward, should sink down, by bending the knees, until the handle grasped rests against the thighs, then taking a full breath, he should lift hard principally with the legs, using the hands to hold the handles in place.

Strength of Chest.—The subject, with his elbows extended at the sides until the forearms are on the same horizontal plane, and holding the dynamometer so that the dial will face outward and the indicator will point upward, should take a full breath and push vigorously against the handles, allowing the back of the instrument to press on the chest.

Strength of Upper Arms, Triceps (Chest Dips).—The subject, while holding the position of rest upon the parallel bars, supporting his weight with arms straight, should let the body down until the chin is level with the bars, snd then push it up again until the arms are fully extended. Note the number of times that he can lift himself in this manner.

Strength of Upper Arms, Biceps (Arm Pulls).—The subject should grasp a horizontal bar or pair of rings and hang with the feet clear from the floor while the arms are extended. Note the number of times that he can haul his body up until his chin touches the bar or rings without bending his body.

Strength of Upper Arms. Numerical.—Add together the number of dips and pulls, multiply the result by one-tenth of the weight of the body.

Total Strength.—Add together the numbers representing the

(1). Average strength of forearms or grip.

(2). Ten times the strength of expiration to the square inch.

(3). Strength of back.

(4). Strength of legs.

(5). Strength of chest or strength of upper arms, numerical.

Development or Sum of Girths.—Add together the numbers representing the

(1). Girth of head.
(2). " chest, full.
(3). " chest, repose.
(4). " waist.
(5). " right thigh.
(6). Girth of left thigh.
(7). " right upper arm.
(8). " left upper arm.
(9.) " right forearm.

Muscular Condition—If the metric system is in use, subtract the sum of girths from the total strength. Should the former be larger, charge the sign of the result.

Vision, } If the English measures are used subtract the total
Hearing. } strength from the Sum of Girths.

Pilosity.—Note the amount of hair on the body and limbs, excluding the head, face and pubes. Scale 1–10.

Color-Hair.—Light.—(Very fair, fair, light brown, brown). Dark.—(Dark brown, black brown, black). Red.—(Red brown, golden).

Color Eyes.—Light.—(Dark blue, blue, light blue). Dark.—(Light brown, brown, dark brown, black). Mixed.—(Gray, green).

TREASURER'S REPORT.

BALTIMORE, MARYLAND, November 24, 1887.

EDWARD M. HARTWELL, Treasurer,
in account with the
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF PHYSICAL EDUCATION.

Dr.

November 26, 1886, by Balance received	$ 2 20
" " " " Gratuity from Chas. Pratt	3 00
" " " " Dues for 1887–88 per Chas. Pratt	1 00
February 11, 1887 by check per C. G. Rathmann for extra copies of Proceedings, &c	30 00
November 26, 1886, to November 24, 1887, by Dues for 1886–87, @ $1.00	90 00
November 24, 1887, by Dues for 1887–88, per Carl Betz	1 00
	$127 20

Cr.

November 26, 1886 to Bill for Printing, &c. (W. G. Anderson)	$28 85
January 1, 1887, to Bill for Printing, &c. (Guggenheimer & Weil)	3 75
" 3, " " Postage stamps (E. M. Hartwell)	2 20
" 13, " " Printers bill on account (W. G. Anderson)	24 40
" 17, " " Postage stamps (E. M. Hartwell)	1 00
" 22, " " Printing and postage (W. G. Anderson)	13 60
November 24, 1887, to Postage stamps (E. M. Hartwell)	0 66
	$74 46

Dr.	$127 20
Cr.	74 46
	$52 74 Balance in hand.

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Miss C. C. Ladd, Bryn Mawr, Pa.

M.D., Boston, Mass

C. F. Schultz, Y.M.C.A., Baltimore, Md.

J. G. Smith, M.D., Young Men's Inst., New York

	No.	.M.	.M.	DEPTH.	Pelvis		
	Hour—Day	—	—		Abdomen		
	Month—Year	—	—		Chest		
	Age	—	—		Neck		
	Weight				Head		
HEIGHT.	Standing			BREADTH	Head		
	Knee				Neck		
					Shoulders		
	Sitting				Waist		
	Pubes				Hips		
	Navel				Chest •		
	Sternum				Nipples		
	Ears			LENGTH.	Sh. Elbow, R		
	Head *				" L		
	Neck				Elbow Tip, R		
	Shoulders				" L		
	Chest Full *				Hand, R.		
	Ch. Repose *				" L.		
	Ch.				Foot, R.		
	Waist *				" L.		

	L.*				Lung Capacity,		
GIRTH.	Knee, R.			STRENGTH.	Grip, R.		
	" L.				" L.		
	Calf, R.				" Avg.		
	" L.				Expiration		
	Ankle, R.				Back		
	" L.				Legs		
	Instep, R.				Upper Arms		
	" L.				Dips—Pulls	—	—
	Shoulder, R.				Total		
	" L.				Development or Sum of Girths		
	Up. Arm, R.*				Muscular Condition		
	" L.*				Vision		
	Elbow, R.				Hearing		
	" L.				Pilosity		
	F Arm, R*				Color of Hair		
	" L.				" Eyes		
	Wrist, R.						
	" L.						
	Hand, R.				Examiner		
	" L.				Clerk		

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VI. 5749

PROCEEDINGS

OF THE

AMERICAN ASSOCIATION

FOR THE ADVANCEMENT OF

PHYSICAL EDUCATION,

AT THE

FOURTH ANNUAL MEETING,

AT

BERKELEY LYCEUM, NEW YORK CITY,

NOVEMBER 30, 1888.

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HARVARD COLLEGE LIBRARY.

Prof. D. A. Sargent

American Association for the Advancement of Physical Education.

REPORT OF FOURTH ANNUAL MEETING.

According to the vote of the Association last year, the annual meeting was held at Berkeley Lyceum, No. 19 W. 44th street, New York City, on Friday, November 30, 1888. The meeting was called to order at 3:10 p. m., by President Wm. Blaikie, and the report of the secretary, Dr. Wm. G. Anderson, was accepted as published.

Dr. F. Swain moved that a few minutes be spent in a recognition meeting, the roll being called by the secretary.

Motion declared out of order by the President.

The President then appointed Drs. Hitchcock, White and Seaver a committee on nominations and the Association proceeded to election of new members who were elected as shown in the list of members.

Messrs. Gulick and Betts were elected a committee on names and to examine into the credentials of applicants.

The President then delivered his annual address which is withheld from publication.

The report of the committee on nominations was then called for, and the following officers elected for the ensuing year:

PRESIDENT	WM. BLAIKIE, ESQ
VICE-PRESIDENTS	D. A. SARGENT, M. D. H. M. STARKLOFF, M. D. MISS C. C. LADD.
SECRETARY	JAY W. SEAVER, M. D.
TREASURER	WM. G. ANDERSON, M. D.
COUNCIL WITH ABOVE	E. P. THWING, M. D. E. HITCHCOCK, JR., M. D. LUTHER GULICK, JR., M. D.

In absence of the treasurer, Dr. Hartwell, his report was read by the President.

The Association then listened to the reading of papers as follows:

1.—Some Fallacies in Vital Statistics. By Prof. Edward Hitchcock, M. D., of Amherst College, Amherst, Mass.

2.—The Physical Training of Women. By Mary Taylor Bissell, M. D., New York City.

3.—The Effect of Physical Training on Youthful and Dullard Criminals. By H. D. Wey, M. D., of State Reformatory, Elmira, N. Y.

4.—The Use of the Sphygmograph in the Physical Examination of Gymnastic Workers and Others. By J. Gardner Smith, M. D., Director of Gymnasium of Harlem Branch, Y. M. C. A.

5.—The New Athletics. By John S. White, L.L. D., Berkeley School, New York City.

At the close of the reading by Dr. Bissell, Dr. Gulick asked for time to ask questions and discuss the papers read according to the announcement on the program that "a brief interval is allowed for the discussion of each paper," but on account of the lateness of the hour no discussion was permitted.

Plans had been made for the reading of a paper in the evening by Dr. D. A. Sargent, of Harvard University, on "The Physical Test of a Man," but on account of illness of the writer no evening session was held.

On motion of Dr. Thwing, it was voted "that the thanks of the Association be tendered to the Directors of the Berkeley Club for their generous hospitality extended to us to-day."

Brief addresses were expected from Dr. H. M. Starkloff and S. Seward, Esq., representing the North American Turnerbund, but neither was present.

The meeting adjourned subject to the call of the Council.

JAY W. SEAVER, Sec'y.

5.

SOME FALLACIES IN VITAL STATISTICS.

By Edward Hitchcock, M. D.

In the field of scientific observation and research we are continually beset with difficulties, doubts and uncertainties. We try what seems to us to be the best methods and they fail us again and again, and then, if real searchers after the truth, we try again and again. In fact the very idea of investigation — making tracks — comes from the simile of walking about where we often must look backwards, and to the right and left to see if our steps are taken in the right direction, or whether we should retrace them, or go to either side, or straight forward.

Hence we cannot fail to often make blunders, errors and mistakes —for to discover certain truths it is essential that we find out some error or untruth or discrepancy which surrounds the particle of truth we are trying to discover, and thus set ourselves on the right track.

When we undertake statistical methods of research we are apt to feel that we are employing the only sure, safe and reliable way. For is not mathematics at the foundation of every science with which we deal? What can be more accurate and certain than the four simple rules of Addition, Subtraction, Multiplication and Division? Have we not reached the ultimate fact in the Divine mind, that of mathematical rule and limit? And so it is if we are to deal only with the strict number and mathematical law. If we are only to count coins, measure wheat or take receipts of imports, then we may have mathematical accuracy and results. But when we have to collate data which require judgment in their selection and separation, when we must decide upon statements from other minds of a character exceedingly varying in grade, when the personal equation holds its full force, then does it come to pass that our judgments are inaccurate and we obtain uncertain results.

And when we make physical examinations which depend on the condition of soft muscular tissue, on tissue which is varied infinitely by the mental or emotional condition of its possessor, then may we with some concern ask ourselves whether all our results are absolutely correct, although we may be morally certain that we have done our truthful best.

Of course statistical work in any field depends for its best result on the *number of observations.* Here is where the American idea of "the biggest, the best" comes in with full and sure power.

The error, the mistake, the accident, is the exception, these are the fewest and are abnormal. and in the great mass of truth which is accumulated, the chaff will be winnowed out.

Hence the first source of reliability in statistical work is numerical fullness. The larger series of statistics, if it embraces the whole field of enquiry, when compared with a smaller one should always precede.

Another point of great value is that the *whole* and not a part of a group be employed for obtaining deductions. For if this be not secured, it is quite sure to be the case that the extreme factors in the result will escape and we fail to secure the average, thus greatly modifying the results. Thus, if the average of the measurements of college students be taken from one of the oldest and largest colleges in the country, where only from 85 to 90 per cent. of the students are examined, the condition of an average college student cannot be so accurate, as, where the total number of students are measured in another college whose numbers are not so great *and all are secured.* For, beyond the 85 or 90 per cent. there would be those men who are utterly indifferent to everything like Physical Education, men puny in their physique, and diffident about being brought forward as an example, or to help ascertain an average.

And on the other hand the hearty, big, stout, and athletic men would be the first on hand to be examined, and make every effort to swell their personal measures and tests, and so would unfairly help to determine the college aggregate or average.

The results of the *men examined* of course would be worth more than the results from smaller numbers, and if the end were simply to compare individuals, the 85 to 90 per cent. containing twice the number examined, would be worth much more than half of that number contained in a total college lot. But if the end be to secure the constants or averages of a *College Student,* that institution which gave results from every man would be worth more than the institution of greater size which examined only a selected number. For it is the two extremes, the exceptions, the abnormalities, the irregularities which are difficult items to secure, and those are the ones which very much modify the final summing up and averages of the tatistician.

One of the great sources of inaccuracy not only in Anthropometry but in any branch of statistical work is the preconceived idea of averages and means.

An idea comes into the mind of a person that such and such things are so and so, and he is sure that statistical research in this direction will prove it to be true. In other words he believes that a magnitude is greater that has been generally given to a certain subject and he goes to work with this idea in mind, and his thoughts, wishes and hopes are working accordingly. Or as another puts it, "Men will twist and torment facts and evidence until they make it quite clear to their own minds, what they wish to be true must be so." (James Ferguson.)

One observer thinks that his boys or girls are larger or taller than those of another school, association or nationality, and he goes to work with the idea that he will prove this to be so, and his judgment, observation, and often his moral acumen will be led astray by this preconceived belief. He may be sincere and conscientious but his wish will be father to his thought; it will be the stowed-away package of iron or steel in the ship's hold which disturbs the magnetic needle in spite of his most honest intentions. The personal bias is most seductive and dangerous in gathering up mental, moral, or physical statistics.

More than 25 years ago the department of Physical Education in Amherst College began to gather data of the amount of time lost by each college student on account of sickness, calling every student sick who was absent more than two consecutive days from all college exercises. Each case was noted and recorded, *and at the end of twenty years* the results were tabulated and averaged for the 20 years to each student, and it was found that every man had averaged a loss of 2.65 days of illness each year during this period.

As friends of women's education were then as now, seeking to give all the zest and advanced information in favor of the higher education of women, it was conjectured that the women's college would make a better showing for the health of their students than would the men's colleges. Accordingly at two of the oldest women's colleges, statistics were gathered in each *for a period of one year*, and in both of them a slight increase of health was shown by the figures as belonging to the women. That is, summary and decisive statistics were announced to the world by comparing about an equal number of factors for one year with 20 years, and that with a preconceived bias all the while. And this may without doubt have been true for the single year observed.

The women who are *selected* to go to the female colleges may be a *privileged lot.* And yet insurance companies, so far as we know, have not in their health tables acknowledged that men as a whole have more sick days than do the women the year around, nor do we learn that they accept a woman's risk of insurance at any lower rate than they do that of a man. When we have the sharp dollar and cent factor in the equation, then we may be sure that investigation will be so close that we may certainly decide if a year's averages are more sure than those of 20 twelvemonths.

THE PHYSICAL TRAINING OF WOMEN.

By Mary Taylor Bissell, M. D.

There is a special interest attaching to any effort to improve the physique of women, since a large proportion of all invalids and medical cases are recruited from their ranks, and because any treatment or method which relieves the disturbances of these patients at once improves the standard of health in the community.

Such an effort has for some years been making through the influence of systematic physical training by the members of this and kindred associations. Of the necessity for it we have no need to speak here, believers as we are all in this new gospel of health, and we need not pause to convince any that women need this training or that they will profit by it.

It is of interest, however, to recall what has been accomplished and what is now being done among women in this direction and to note the quality of the result as well as to question the future for possibilities of improvement.

And first we may note as of significant import that with the exception of private institutions where occasionally an individual is working single-handed, that the initiative in systematic physical culture for women has been taken by women's colleges. The institutions which the public has criticized as enemies to the health of women prove, upon investigation, to be the only ones, with one or two exceptions, where their physical training is conducted on any thorough and scientific basis. So that when we look for the harmonious and coincident development of mind and body, and for an improvement in the standard of health during the period of school-life, we need not turn our eyes to the schools of fashion or to the conventional seminary for girls, but to Vassar, Smith, Wellesley and Byrn Mawr, to the Harvard Annex and to kindred educational institutions of the country, where coincident with the intellectual standard is being developed a standard of health among women which can be demonstrated as *higher* than that of the uneducated girl. It is in these institutions alone that any adequate sense of the educator's responsibility for physical development is apparent, for these centres of learning for women are the only ones that command resident medical officers of good standing, constant instruction in physiology and supervision in personal hygiene, practical physical training at the hands of expert instructors with superior facilities for the same in open air as well as under cover.

Coincident with the opening of the first women's college in America twenty-five years ago, gymnastics were systematically taught, although in those early days the students had no place but the corridors of the college building for this purpose. A separate hall was soon set apart for them, and since that time systematic physical training as well as lectures in physiology and personal hygiene have formed part of the curriculum at Vassar College. The college has, however, now outgrown its old building and a new gymnasium is to be erected this season.

Wellesley College, later in the field, has also possessed an organized department of physical training for seven years. Although only about one-half of her students are able to receive the advantages of such training owing to numbers and deficient gymnasium accommodations.

Bryn Mawr opened her gymnasium for women simultaneously with her academic course, three years ago, a building which up to this time is the best equipped for the physical training of women in the country.

The Harvard Annex has the advantages of the Cambridge Hall and training under expert instructors.

Smith College has long been doing good work in this direction, the training, as at other women's colleges, having the advantage of the combined direction from the resident physician and an expert director of the gymnasium.

Other collegiate institutions, notably the Packer Institute and the Adelphi Academy, of Brooklyn, offer fine halls for the physical training of students. Rockford Seminary in Illinois boasts the finest gymnasium for women west of the Alleghanies, and although New York has lagged somewhat behind in providing advantages for women in this direction, the building we occupy to-day is now open for the physical training of women as well as men, and is only the fore-runner of a second like structure, which we are advised, will be dedicated in the spring to the physical culture of New York girls. I have also received letters from California, Dakota and other Western states, as well as from Southern localities, indicating the interest and enterprise aroused in these regions in the physical training of women, but in the localities already named we find the best opportunities at present, with the longest experience, and to these we naturally look for definite data and results. And first, as regards the system used:

In all of the colleges for women as well as at Rockport Seminary, and in the Ladies' Athletic Association of this city anthropemetrical data and vital statistics of each pupil are recorded, such as are recognized by this association. In my own more private classes, as well as in the schools where I examine, I have followed the same rule. In many cases additional data are obtained which are of importance and interest in regulating the lives of the individual.

The system of training used in these various localities may be called an American eclectic system, being as it is an adaptation of the German light and heavy gymnastics, the Harvard system of training with special apparatus, and such additional methods as the experience of the director suggests.

At Byrn Mawr College, attendance in the gymnasium is voluntary, but I am informed that the attendance in the first year of the college course was 85 per cent. of all resident students and has now increased to 90 per cent., the average amount of time being nearly three hours per week. Both light and heavy gymnastics are used. The director thinks more heavy work is done there than at any of the other women's colleges, although probably very little compared with what is done at the colleges for men.

At Smith heavy gymnastics are not used at all, as the director finds her classes too large and her assistance too limited to permit of any series that is not applicable to all. The work is obligatory during the first two years, elective for the last two. The time required is two hours weekly.

At Wellesley College only light gymnastics are taught. The classes spend about one hour and a half per week in the gymnasium, in periods of half an hour. Special work is elective and only a small proportion take the second yearly physical examination.

Systematic compilation of statistics, however, has enabled them to form a class as well as a college standard of development. Special papers of inquiry called health papers are distributed among the students, by means of which information is elicited concerning the daily habits of the girls, the condition of the different functions of the body, their habits of dress, etc., etc. The Delsarte system is somewhat used with special reference to chest expansion. The college has no athletic club and no out-of-door sports except tub races on the lake.

Vassar College combines heavy and light gymnastics in about equal proportion, over 25 per cent. of the work done is elective, special cases recieve the advice of the resident physician as well as of the gymnasium director. Out-of-door sports, such as tennis, trycycling, base-ball for women, and skating receive enthusiastic attention from the pupils.

The work at Rockford Seminary is entirely light gymnastics, the director writes me that public sentiment against heavy work for women is too strong to be overruled. Three hours per week are allowed for practice and the classes are arranged according to strength, with no reference to class year.

Attendance at the Harvard Annex is voluntary. Dr. Sargent informs me that about one third avail themselves of the privileges of the gymnasium, many of the students being day scholars, who come to Cambridge only to recite. The advanced class use light and heavy gymnastics, the elementary only light gymnastics and free movements. Time about one hour and a half per week.

Inquiries from all of these sources of information, as well as my own personal experience in limited classes for three years, justify us in considering certain facts as established as regards the physical training of women.

Expressed in its most moderate form, we are at liberty to state that nothing but good has resulted from the system, and in many cases this language is cold contrasted with the enthusiastic expressions of those whose experience entitles them to consideration.

"We graduate students in better health than when they entered college," is the testimony from Smith. "In many cases they show a wonderful improvement."

"I cannot say too much in praise of this work for girls," writes the director of the Wellesley gymnasium. "I have taught two years, and in all this time I have never had a sprained wrist or ankle, or anything but the most gratifying results."

The director at Rockford Seminary writes me, "It has been conceded by the principal that since we have had this system of physical work the girls have done better brain work, they are not absent from recitations as much, and they are in a better, healthier condition all the time."

Dr. Sargent tells me that the results from the Annex advanced classes are very encouraging and that if they could get more time the improvement would be more marked than it is.

The testimony from every quarter is not only negatively encouraging as proving immunity from harm, but positive and unanimous, and enthusiastic as to the influence of the training upon the standard of general health.

As regards special cases, and the influence of gymnastic training for good or evil upon the special functions of women, which appears to be an open question among many physicians as well as the laity, I have equally encouraging facts to report.

Careful inquiry into the records of these large gymnasiums which are under medical and other expert direction, as well as my own experience in class and individual work convince me that so far from increasing a tendency to pelvic disorders in girls, physical training is proving, as we should expect it to do, a source of improvement and vital relief.

The resident physician at Vassar writes me in regard to this point:

"I have never known any cases to be injured, nor have I been able to find from inquiry and search of records (extending over 25 years) that it has ever occurred," and adds, "I should say, judiciously managed, the good results were 99.5 per cent., the .5 representing cases not taking gymnastics on account of acute troubles."

So far as my own experience is concerned, I may say that no case of this kind coming under my observation, has failed to receive either partial or total relief from physical exercise, judiciously prescribed. The marked improvement resulting in these cases and kindred lines of development lend additional weight to the widespread conviction among the profession that the miseries and perils which too often attend motherhood in persons of lax or incomplete development, might be largelv obviated by judicious physical training in early life, by which a complete development of organs, and more vigorous resistance to untoward influences might be effected.

As bearing upon this point I may mention the testimony of a body of circus performers, women whose daily life, as is well known, requires constant, often heavy, gymnastic exercise. These women said that their physical training began at the age of 7 years, and assured my colleague, who questioned them on the point, that pelvic weaknesses and complaints were unknown among them except in one or two cases who had entered upon their course of training later in life, and that among their number the functions of motherhood were invariably performed with safety.

As regards anthropometrical data, the actual gains in measurements of the body, these are in my opinion less vital than the other points at issue, yet they have their value as being, in some sense, a visible sign of the inward gain, as well as a stimulus to the individual and a source of pride, and our data here is as gratifying as in other perhaps less tangible respects.

To see a delicate girl with a hollow chest and stooping shoulders, thin arms and a drooping carriage, gain from one to three inches in chest girth in four months time, one or two inches in arm measurements, to find her spine growing more erect and her chest capacity increasing 25-50 c. inches, while strength tests show that she has doubled the power of back and limbs, is a gratifying result which is not uncommon as shown by the vital statistics from various quarters.

In this connection I quote a few notes from the director at Byrn Mawr, not only because of their intrinsic interest, but also because they are more or less representative of the common experience in this direction. She says:

"At the end of my first year in the gymnasium I could not believe that the gains indicated by the measurements would be at all permanent, but I have been rejoiced to find that after the *second* winter's work, the gains of the first seem to be permanent, and many of the students are not only in possession of the immensely increased strength of the first winter, but they go on adding to it during the third winter.

"I will give you a few results of second examinations of the Freshmen at the end of last winter's work:

65 per cent. of the Freshmen had gained in weight.
74 " " " girth of chest.
95 " " " strength of chest.
61 " " " capacity of lungs.
95 " " " strength of legs.
100 " " " strength of back.

"These would of course be of little value if they were not followed by the same examinations thrice yearly; but repeated examinations show that the gains are lasting."

One interesting point is brought out by comparison of these statistics from year to year, viz: that the gains in measurements and strength tests and also the most marked improvement in general health and vital energy are invariably greatest during the first few months or the first year of training. This fact has, I believe, been already noted in the training of men, and it would seem to indicate that nature both needed the new incentive and was willing and able to respond to it. The fact has also a rather melancholy interest as indicating the degree of physical deprivation that these students have suffered from the lack of early opportunities to cultivate their bodily powers, and imagination pictures the degree of physical development that many such women might have attained, under a system of physical culture begun in their infancy. As illustrative of marked *constitutional* benefits with comparatively *little* of anthropometrical interest I may quote from my notes of one or two cases. Case 1 was one in which I feared incipient phthisis.

Case I. — Family history bad, patient of extremely delicate build and anæmic, rachitis in infancy had left her chest undeveloped; had had pneumonia which had left her with one hepatized lung; had dyspepsia and sick headache constantly, also frequently recurring attacks of bronchitis; appetite poor and was very easily fatigued. The evident failure in nutrition and loss of strength gave me great anxiety.

She was put upon a highly nutritious diet, but had no medication. Began to take systematic exercise in class three times weekly, for an hour, resting as required, and began a course of home exercises as well. She soon improved in digestive capacity, gained four pounds in weight the first six weeks, appetite and strength both increased.

At the end of three months she assured me she felt like another being, her improved condition being apparent to all. She gained five pounds in weight, one-half an inch in chest and the same in arm girths, and something in expansive power; bronchitis and dyspepsia were practically cured, and functional pelvic disorders entirely relieved. This improvement in general health has since been most satisfactorily maintained.

CASE II.—Was one of hysteria, 17 years of age. Strumous diathesis, but general health had been excellent until year previous when constant headache began, at base of brain, also frontal. Muscular weaknesses marked. She had numerous disturbances of sensation in various parts of the body, also psychical symptoms. Wept on slight excitement, was almost hypochondriacal over her symptoms. Imagined she had various organic diseases. Parents much distressed over her loss of health and especially over the nervous symptoms.

Careful examinations revealed absence of any organic disease. Her diet received special attention, but with the exception of a short course of iron she had no medication. I advised light exercises, which she took under my direction twice weekly and also at home. Was recommended to give up study temporarily. At first the exercises seemed to fatigue her very much, although she did not join any class, but took them alone in order to have frequent intervals for rest.

In two or three weeks, however, she had gained strength and soon joined the regular class, exercising three times weekly for an hour, resting at intervals. She used principally the chest weights, light bells and free exercises. The interest of the class appeared to be a happy one. She began to take pride in her accomplishments, and though the return to health was gradual, the end of three months found her, as her mother said, another girl, headache and hypochondria gone, appetite returned and a new look of vigor and health replacing the rather tired and unhappy expression. She had gained 1½ inches in her chest measurement and ¼ of an inch on her arms, but these figures in no way expressed the improvement in her nutrition, sedation of nerve centres and renewed health.

Such cases are no doubt being constantly duplicated everywhere in the experience of those who are directing the physical training of women.

So far as my own observation goes in the measurement and general examinations of girls, I find them with a fairly good chest expansion which is, perhaps, to be explained by the type of thoracic breathing which their dress encourages, generally with more or less weakness of spinal and abdominal muscles, which encourages lordoses (protruding of abdomen and other undesirable poses), a large number, about 33⅓ per cent., of lateral curvatures of greater or less degree, and much myopia.

These defects (omitting the more serious curvatures) have been demonstrated to be remediable under judicious gymnastic drill, and I would lay considerable stress upon drill in walking, marching and running for most of these cases and think that while the aim of military drill is very different in the case of men and women, military precision should be exacted in marching as an excellent bit of general drill work for girls.

On the other hand I am convinced that outside of the gymnasium where walking is not interrupted by more general muscular exercise, many women overdo the doctor's prescription for a daily vigorous walk, given as it doubtless is for the sake of general exercise and out of door life, and that such long walks prove more harmful than useful.

I should call anything over a mile and a half or two miles a long walk for a city bred woman, and I believe the majority are more benefited by a walk of a mile or a mile and a half than by the longer distance, for the reason that many of them suffer from a degree of spinal irritation, pelvic congestions, etc., which are aggravated by a form of monotonous exercise like walking. Where one set of muscles only is brought into play, as in the case of these of the lower extremities, any monotonous movement, sufficiently long maintained, tends to local as well as pueral exhaustion, and certainly in many cases has aggravated tendencies to local congestions which a half hour's daily practice in the gymnasium with its more even distribution of nervous and muscular activity might have averted. However, the vitalizing effect of sun power upon growth, and the mental and physical exhilaration derived from contact with the bracing air cannot be omitted from the consideration of this problem. Certainly it suggests the necessity for the best of sun and air exposures in our gymnasium, as well as the provision of suitable opportunities for general muscular exercise in out of door sports. There are many interesting lines of inquiry which this subject opens up, some of which the wider experience of members of this association qualifies them to answer, some which time only can satisfy. The amount and variety of heavy gymnastics for women and their utility is an interesting question upon which we have less data than is desirable. Undoubtedly their advantage depends somewhat upon previous as well as upon their age and general condition of the subject. The question of the adaptation of gymnastics to special cases also requires some attention, as well as that of the early training of young children. Upon these and kindred topics we may hope to receive light from the combined experience of this association.

PHYSICAL TRAINING FOR YOUTHFUL AND DULLARD CRIMINALS.

BY

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Being an epitome of a Monograph prepared for the Industrial Education Association of New York, and a paper read before the National Prison Association at Boston, July, 1888.

The physical training of youthful criminals and dullards has been criticised in certain quarters by reason of its purposes being neither appreciated nor understood.

Physical renovation has been employed as a means contributing to a condition favorable to education, the training of the head and hands.

It is now generally accepted, that nothing accomplishes so much toward the reformation of the delinquent as education, which should be regarded as the cultivation of a correct habitute of mind and body, a something more than a merè knowledge of the three R's.

"Once a thief, always a thief," applies to those who, with moral natures blunted and environment bad, live a life of criminality unchecked and unrestrained. It may be said with reasonable positiveness that the youth in whom criminal instincts are strong never voluntarily relinquishes criminality and readjusts himself to society: and the delinquent well advanced in years does not think of reformation until age has impaired his faculties and destroyed confidence in his cunning.

Their malpractice has its origin in blunted or non-developed nervous areas, and is indicative of wrong-headedness. Whatever may be said of the motives or incentives that led to crime, the fact remains that the head of the criminal is wrong. The average youthful criminal, as encountered in the prisons of the state, is an abnormal production, physically, mentally and morally. Generally under weight, with repulsive features in some one or more lines, and assymmetrical head; he is coarse in fibre and heavy in his movement. His mind, while not diseased, is undeveloped, or it may be abnormally developed in certain directions; the smartness resulting therefrom partaking of low cunning and centering about self. He is deficient in stability and will power, and incapable of prolonged mental effort and application. His intellect travels in a rut and fails him in an emergency. His moral nature shares in the imperfections of his physical and mental state. He does not possess the power to discriminate between right and wrong, or if so, it is in favor of himself and avails nothing to society. It is easier for him to incline to evil rather than to good, to the animal rather than to the intellectual, and in this he is true to himself. His is a perverted moral nature; a blunted mind and a crude body. These peculiarities are to be noted alike, though in varying degree, in the thief and thug gathered in from the city slums and haunts of vice and in the offender who has enjoyed a social status and is acquainted with the amenities of a gentle life.

The mind and nervous system of the criminal is in harmony with his body in its abbreviation. His mental and moral characteristics are peculiar and marked, being admirably described by Francis Galton in "Inquiries Into Human Faculty." David said in his haste, "All men are liars;" had he had knowledge of the criminal type he could have expressed himself with equal emphasis and after due deliberation.

There is a class of criminal dullards that cannot be considered as mentally unsound or representatives of the feeble-minded group, yet are incapable of any prolonged mental exertion, whose efforts in the workshop are spasmodic and unsatisfactory, requiring constant spurring on to hold them to their tasks. By bodily growth and conforming to a better type of the merely physical man through physical training, it has become apparent that it is possible to excite cerebral activity in those dull in mind and heavy of body. The value of physical exercise and training as an adjuvant to mental growth is appreciated by our colleges and universities, in accordance with the belief that physical training will not produce acrobats and professional athletes merely, but bodily and mental health if wisely directed.

Physical training is especially indicated in the case of the youthful criminal not yet out of his teens, who enters upon his prison life poorly nourished, anæmic, and with muscles soft and flabby, whose life has been passed in dark and unsanitary tenement houses, or homeless upon the street, exposed to the vicissitudes of weather. To such an one, as well as to the dullard and the shuffling country lad, whose every motion expresses mental lethargy, indicative of a development of the motor centres of the brain insufficient for the proper coördination of his muscles, it becomes a mental as well as a physical setting up.

It is not necessary that exercise should be agreeable in order to be beneficial. All exercise, when pursued systematically, becomes distasteful and irksome after the charm of novelty has passed away. The captain of the "Varsity" crew, in training for the race, experiences difficulty in keeping his men together and holding them to a rigorous regime after their first enthusiasm has subsided, in spite of their ardent desire to carry their colors on to victory. The continuation of physical training, after novelty ceases to be a stimulant, adds a training of the will to that of the body and becomes a lesson in self mastery and control. And the very energy required to be put forth in overcoming this distaste is a wholesome discipline.[1]

At the New York State Reformatory, in 1886 and 1887, during a period of sixteen months, I subjected 43 dullards, divided into three classes, to a course of physical training, and at the present time have in hand three classes, aggregating 50.

The first class was formed June 5, 1886, and consisted of ten whites and two colored, of an average of 22.9 years: 19 and 29 years representing the extremes. For a period ranging from one to two years these men had made no appreciable progress in school work, and the performance of their daily tasks had been equally unsatisfactory. In physiognomy they presented features indicative of criminal tendencies. Not one had learned a trade, but all had made a precarious living as common laborers, tramps, hostlers and street loafers. One was convicted for assault in the first degree; five for burglary in the third degree; one for grand larceny in the first degree; three for grand larceny in the second degree, one for rape and one for attempted rape. The environment of most of the men previous to conviction was bad, many of them confessing to have had intemperate parents, while one told of an insane, and another of an epileptic mother.

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[1] D. A. Sargent, M. D., Scribner's Magazine, July, 1887.

The plan followed in connection with the class was the substitution of a special dietary for the regular prison fare, and the weighing out of his rations to each that all might fare alike and be observed under precisely the same conditions. The school work of all was to be continued in a common course, the more advanced being put back to the level of the lowest; which could easily be done without prejudice to the former.

The physical part of the program comprised baths at frequent intervals and with regularity in conjunction with passive exercise, as kneading the muscles, working the joints, and friction applied to the entire body through rubbing by a professional trainer, as employed in the Turkish bath; and, later in the day, a manual drill and calisthenics to furnish exercise, and supplement the routine task hitherto daily performed in the shop.

June 5, the class commenced work, at which time I made a physical examination of each member.

All were well nourished, with the exception of one, who was convalescing from an acute disease. There were no indications of disease of the nervous, respiratory, vascular or digestive systems, and the bodily functions, save that of the skin, were all well performed. Five had acne, a cutaneous disorder commonly encountered in penal institutions, and provoked or aggravated by well known causes; and one, ichthyosis, or fish skin. The second grade contributed three, and the third or lowest grade, nine men.

The average weight per man was 133.68 pounds, and the average height, 5 feet, 4½ inches.

Six were under and six were over weight in proportion to their height, the former averaging 12.54 pounds below and the latter 7.04 pounds above the standard.

Instead of taking their meals in their cells, as formerly, the class was provided with a table in the first grade dining room, where they ate under the supervision of an officer, that there might be no passing of food from other tables or from man to man. Breakfast was served at 6, dinner at 12, and tea at 5 o'clock.

The following was the weekly dietary:

Breakfast: Coffee-cocoa, one pint; bread, eight ounces; butter one-half ounce.

Dinner: Sunday: — Cooked meat, free from bone (roast pork, beef or mutton), five ounces; vegetables, nine ounces; bread, three ounces.

Monday: — Cooked meat, free from bone (boiled bacon or pickled pork), five ounces; vegetables, sixteen ounces; bread, three ounces.

Tuesday: — Cooked meat, free from bone (boiled beef or mutton), five ounces; vegetables, nine ounces; dumplings, five ounces.

Wednesday: — Cooked meat, free from bone (meat pies), three ounces; pie, four ounces; vegetables, twelve ounces.

Thursday: — Cooked meat, free from bone (boiled bacon or pickled pork), five ounces; vegetables, sixteen ounces; dumplings, four ounces.

Friday: — Fish (fried or boiled, with melted butter), ten ounces; vegetables, nine ounces; bread, four ounces.

Saturday: — Cooked meat, free from bone (Irish stew), three ounces; stew, sixteen ounces; bread, six ounces.

Supper: Tea, cocoa, or milk, one pint; bread, eight ounces; butter, one-half ounce.

At 8 A. M. the class was marched to the school room. An idea of their mental attainments can be formed from the fact that one could neither read nor write; one barely do either; four understood the successive steps necessary to work an example in long division, but never could obtain the correct answer; while the balance came to grief upon the shoals of rudimentary arithmetic from notation to simple division. Their stock of information was surprisingly small, being generally limited to a slight knowledge of the things they liked to eat and the work they preferred to do. Not one knew the name of the country in which he lived, its physical features, or the location of cities and states.

At the conclusion of the school exercises came the bathing. Having no data at command, as to how frequently a man could bathe without physical deterioration, I was obliged through observation to determine this point. Beginning with a bath every day, but finding this too enervating, changes were made from time to time, until the routine resolved itself into three baths a week per man: one tub and two vapor baths one week, followed the next by two tub and one vapor.

The tub bath consisted in placing a man in a tub of water heated to about 100° F., and leaving him there to rub and soap himself for fifteen minutes or longer. From the tub he was placed upon a marble slab where he was douched with hot and cold water and sprayed. After this, the body was spatted until the skin was in a glow, the muscles pinched and kneaded, passive motion of the joints employed, followed by a brisk rubbing with a coarse crash towel or Turkish bathing mitten, all this being done by a professional trainer, who was available at the time. Being obliged to make use of the facilities at hand, the vapor bath was the moist instead of the dry or heated air, and consisted of turning steam into a room and maintaining an atmosphere of 115° F. A staging was erected about six feet from the floor provided with seats, and upon this the men were placed with a bucket of cold water and a sponge, to wipe their faces as they desired. Here they remained about 20 minutes, perspiring profusely, when they were placed upon the marble slab one by one, soaped and douched, and manipnlated by their trainer as has been described, after which they were locked in their cells. Generally after being subjected to this treatment, and upon their return to their cells, they would wrap themselves in their blankets and sleep till dinner.

After dinner, all were unlocked and taken out upon the flagging, where for two hours or more they were put through a drill for physical exercise, and to compensate for the partial inactivity resulting from withdrawal from the shop and their former daily industries.

In the beginning the evolutions consisted of the movements comprised in the "setting up" drill, as employed in the case of raw recruits, previous to drill upon the field, supplemented by dumb-bell exercises. Such, in brief, is an outline of the plan pursued with these twelve men.

During the first month it was expected that all would lose in weight. The radical change wrought in the daily routine life, the furnishing to all of a stated allowance of food, sufficient for every purpose under existing circumstances, but not allowing of stuffing in excess of actual needs, would, it seemed, result in a loss of weight that would be more than gained before the conclusion of the course. That such was the case the weights, taken July 1st., will show, and which is based upon the examination of eleven men, the twelfth being in the hospital with facial erysipelas.

The average weight of the eleven men was 129.31 as against

133.68 pounds, the average weight per man of the entire class June 5, or an average decrease of 4.37 pounds for the eleven; ½ and 9, representing the least and greatest loss of weight, while two men actually gained ½ and 1¾ pounds, respectively. The school work was conducted in a painstaking manner by the School Secretary to whose care it was committed, and called for greater mental effort on the part of the class and longer continued activity than they had ever indulged in. Suffice it to say that in the beginning all were drilled in penmanship and reading, with daily exercise in mental arithmetic according to their capabilities. As they slowly advanced with their studies an increased mental activity was noted, and the workings of the mind were less forced and laborious than at the beginning. In mental arithmetic they made progress, and were able, with comparative ease and rapidity, to add three or four single numbers.

Beginning with notation and numeration they were drilled in rudimentary arithmetic, and carried through division and cancellation with a thoroughness that enabled them to work correctly in the operations in which they had received instruction.

Greater attention was given to arithmetic as a mental drill and discipline for the reason that the average criminal displays a remarkable ignorance of the science of numbers, as if there were in his composition a deficiency of logical, deductive and analytical power. In substantiation of this I will mention that the largest proportion of failures in school work in the Reformatory is in mathematics, and I have no doubt that the experience of others engaged in educational work in penal institutions is of a similar nature.

In language, sketches and stories were read to them by the instructor, or by one of their number, and in a measure the study of geography was combined with this exercise by locating upon the map the countries and towns mentioned. They were, in addition to their reading exercises, furnished with paper that they might write from memory, and in their own language, the sketches read to them the previous day. The few who could not read or write, or with difficulty do either, were instructed in their A, B, C's, and in writing.

When the men began their manual exercises they were an awkward squad, and it was a matter of patience and perseverance to teach them to execute the figures simultaneously and with precision. They were slow to comprehend an order and deliberate in its execution.

They began with the "right foot, left foot" step and in time were taught other evolutions until they were able to march in line and keep step, which last was a matter of weeks. When they could do this and do it well, they were drilled in dumb-bell exercises commencing with bells weighing three pounds, which were replaced in time with heavier ones, until a maximum of eight pounds was reached. With subsequent classes I discarded the heavier bells, never using those exceeding three pounds, as I found they answered every purpose in the work of muscular devolopment without irritating the men through unnecessary fatigue, thereby prompting them to "soger" and malinger. November 6, the class was discontinued, and the following day a physical examination of the men made as in the beginning.

The nine men in the third grade in the beginning, attained the second, and, there being no reductions, all were in the second grade at the termination of the class.

June 5th the average weight of the twelve men was 133.68 pounds. During the five months the class was under observation there was a net gain of 14.75 pounds, or an average increase in weight per man of 1.23 pounds. These are relative figures. In fact, eight gained and four lost weight. The average gain per man of those who gained was 8.26 pounds: two and nine standing for the extremes.

Of the four who lost in weight, the average being 7.56 pounds, 2 and 16½ represent the minimum and maximum loss. As in June, six were under and six were over weight, with an average of 11.29 and 8.62 pounds respectively.

The drill and discipline they were subjected to wrought an improvement in their physical condition. The baths and stimulation of the cutaneous system brought the skin to the highest degree of functional activity, overcoming the integumentary disorders of the five, noted in the beginning. The daily drill and dumb-bell exercises hardened and developed muscles that previously were soft and flabby, and the entire muscular system acquired firmness and power. The setting up drill improved the carriage and conferred a rapidity of action not before indulged in. The aimless shuffling gait gave way to a carriage inspired by elastic muscles and supple joints. The faces parted with the dull and stolid look they had in the beginning, assuming a more intelligent expression, while the eye gained a brightness and clearness that before was conspicuous by its absence.

With physical culture and improvement there came a mental awakening, a cerebral activity never before manifested in their prison life. The purely animal man with his ox-like characteristics seemed to recede before the intellectual. Their progress in school work was not steadily onward, but intermittently progressive.

For a time they would learn with comparative ease and appear to assimilate their mental food, when, suddenly, and without apparent cause, without any deterioration in their physical condition, their minds would cease to work and they would lapse into their former state of mental inertia.

This might continue for several days, when the mental cloud would slowly lift, and they again give evidence of mental quickening. It was as hard to develope their mental receptivity as their power of retention. During the five months they were under observation their average marking in school was 74.16 per cent. as against 45.25 per cent. for the five months immediately preceding their course of special training.

Upon the discontinuance of the class, November 7th, the men were assigned to various shops and employments, and the primary classes, and were subjected to the same influences and the routine of prison life as prevailed before they were selected for physical experimentation. During the following six months they were watched with interest, to observe whether they would maintain themselves in their elevation, or fall back into their former state of sloth and mental lethargy. In order to obtain a perfect record, each man had to earn nine marks a month (three in demeanor, three in labor, and three in school, in the latter case correct answers to 75 per cent. of the questions being the standard required to obtain full school marks, that is, three).

The advance made in moral and intellectual development, represented respectively by — $2\frac{1}{2}$ and $1\frac{3}{22}$, before, and $2\frac{1}{3}$ and $2\frac{9}{30}$, after, is most striking, and occurs in no one isolated case, but is common to all.

October, 1887, nearly a year after the abandonment of the class, the status of eleven men, (the twelfth, a southern negro, having died of consumption) was: Released by expiration of maximum time, 1; paroled, and out upon ticket-of-leave, 3; first grade, 4; second grade, 1; not doing well, 2. The three men in the second and third grades, and not doing well, have proved recreant in moral rather than in intellectual lines; while those in the first grade were making an honest effort, through the three-fold course, to obtain their release and demonstrate their ability to maintain themselves in rectitude. The stimulation of the physical powers the year before, in the case of three, impressed their mental organization to a degree that enabled them to earn their release upon parole, whereas, if left to themselves their minds would never have been quickened, as a reflex of an improved physical state.

The two succeeding classes were treated in the main in a manner similar to the first.

Their physical course was not as thorough or satisfactory, owing to the loss of the trainer, who was released upon parole, and whose successor was neither as capable nor competent. In spite of the disadvantage of an indifferent instructor, the men improved appreciably, and gave evidence of what could be accomplished under competent guidance.

Instead of having a special dietary, they received the regular prison fare and ate in their cells. In school they continued their work in their respective classes as before. These men did not possess the ox-like traits presented by the first class, and though more prepossessing in their physiognomy, were more difficult to manage and impress. They were inclined to malinger and would often deliberately reduce their physical condition by placing themselves in antagonism to the system being pursued. A few of them were country clods, stooped shouldered, and heavy of foot; the balance being city born and bred, undersized and poorly nourished. The most of them had been recently received, and were selected for physical training, that through bodily betterment they might be the better able to maintain their standing and earn their marks when subjected to the routine of task in school and shop. The others were dullards in school and sluggards in the shop, picked out for special training, that through bodily improvement, mind and muscle, in their reciprocal relations, might work in harmony. They were all specimens of either mental or physical abbreviation.

Before the mind could be impressed in the case of these dullards the body was brought to the highest degree of perfection and functional activity, in expectation that increased cerebration would follow developed muscles and stimulation of the peripheral nerves. The late Dr. Edward Seguin, by the systematic training of the hand

and eye, ignoring letters in the beginning, gave understanding and cunning to an idiot brain.[1]

The criminal dullard is a being of coarse fibre. He represents raw material waiting for a moulding hand to overcome his crudeness and give him impress. To accomplish this, radical measures must be employed, and a departure taken from time honored methods of procedure. In the beginning the school room should occupy a secondary place. Bodily improvement, and through this, the placing of the brain in the most favorable condition for mental action, should mark the initial movement, after which it will be time to employ the usual and more common methods of teaching as carried out in the school-room.

The tendency in the past of the philanthropically inclined, in dealing with the criminal and overcoming his abnormal inclinations and practices, has been largely through appeals to his better nature and playing upon his emotions. Owing to the changeableness of his mind, (and I am speaking of the youthful delinquent,) his last impressions efface those that preceded them and will in turn be supplanted by their successors of to-morrow. He readily responds to the excitement of the passing hour, and as the strings that move his feelings are played upon he answers to the stimulus, expressing contrition for the past and hopes for a better future, if he sees this is desired; or repents and experiences a religious sentiment, a pardon's worth, if it will secure him prison favors or a release.

The volatility of his nature and unstableness of mind are such that all efforts to readjust him, made through the emotions, end in disappointment to the worker, subsequently furnishing merriment and amusement to the subject — and the player is played upon in turn.

Good and healthy sentiments cannot originate in a morbid mind that has found its expression in crime, whose dwelling place is a stunted frame, healthy only so far as the performance of the functions of merely animal life are concerned. The educational methods of the past commonly in vogue have been to train the mind and the special senses, with a confidence conceived in ignorance that the body needed no other attention than food sufficient to supply it with needed energy, the setting aside of certain hours for sleep, and clothing to protect it from the vicissitudes of weather.

The popular opinion that has been the brain is cultivated at the expense of muscle, and muscle at the expense of brain; that a man cannot excel in both at the same time. The law of mutual dependence of the various organs has been overlooked and the mind — the brain — has been cultivated at the expense of physical deterioration. The body deteriorates not because it is a part of nature's scheme it should do so under intellectual growth, but in consequence of the neglect it has received and violation of certain inexorable laws. Plato said to train the mind and neglect the body was to produce a cripple. The pedagogue has considered body and mind as a duality instead of a unity, and the physical basis of brain work has been overlooked.

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[1] Archives of Medicine, October, 1879, and December, 1880.

In the training of an abnormal mind, be it criminal or otherwise, (and it goes without saying that the criminal mind is not normal), the most approved methods of education should be employed. In the training of defective minds, minds in defective or poorly developed bodies, the body should first be brought to the highest attainable degree of perfection. Proper food, regular hours for sleep, sanitary surroundings and the discontinuance of habits that stunt the body and blunt the mind, as the use of tobacco and narcotics, are not enough. Physical training, physical culture, is indicated.

In obedience to the dictates of the human sentiment abroad throughout the land the State has erected and maintains costly buildings for the insane; provides asylums for the deaf and dumb, the blind and feeble-minded, and seeks to correct their defects and ameliorate their condition. Its criminal wards it secludes, utilizes their labor, ministers to their necessities if they become sick, but beyond this fails to take cognizance of their physical state.

The defective body, the habitation of the imperfect mind is considered only as it may become necessary to prop it up to prevent decline or dissolution. Physical training as an end to cerebral activity and mental increase, or to promote body growth and conformity to better types of the merely physical man is not yet included in the prison curriculum.

But I fancy some may say Why train the criminal in athletics when the common round of daily task will suffice to furnish him with needful exercise. I answer, there is a certain class of dull minds in inert bodies to whom the task of shop is automatic drudgery, who without bodily improvement and mental quickening will all their lives be hewers of wood and drawers of water.

Athletics and physical training are not synonomous terms. The former implies and is a specialty of the latter and finds its expression in boxing, rowing, and the field sports, as base and football, tennis and sprint running; sports that develop only certain muscles, largely those of the lower half of the body, or, where the upper limbs and trunk are employed, those of the right side, and entered into in a measure for the excitement that follows their public exhibition and the distinction attaching to the participant.

Physical training in its most literal sense is the cultivation of organic perfection of the human body in its entirety and an approximation to the physical proportions of a typical man. It is the correction of disparities in accordance with the law of adaptation and harmonious adjustment of parts.

Prison officials recognize a class of dullards and illiterates in whom body and mind instead of acting reciprocally and for mutual benefit, seemingly have operated as a drag the one upon the other. Prison methods of the past have accomplished with such little more than a specified number of hours of work per day and the observance of certain rules of government.

The physical culture of these behind-hand ones should be undertaken during the period of bodily growth, when every organ, limb and tissue is in a plastic state, changing and capable of being changed. A systematic and rational education of the body causes improved blood to take the place of poor and vitiated, enabling the various organs to perform more and better work, begetting strong limbs and a shapely frame. The physical reconstruction of these dullards and sluggards becomes something more than the mere acquisition of muscle and brawn. It is the modification and change to a better form of a frame handicapped by the transmission of criminal tendencies, or stunted and embarrassed in its growth by vicious habits and surroundings that finally found expression in crime.

That physical training has not been made part of the scheme in the management of this class of defects I believe to be due simply to the fact that the laws of physiology have been either lost sight of or ignored; and the mental side of the question of their readjustment has obscured and hidden the physical. "Mind and body should be viewed as the two well-fitting halves of a perfect whole, designed in true accord mutually to sustain and support each other." Physical education looking to mental quickening is in accordance with the laws of physiology. Mental development and culture ignoring the fact of a physical basis, soon resolves itself into a study of pathology and morbid anatomy.

The performance of gymnastic feats and tricks is neither desired nor aimed at. The object of physical training is not to make these men strong as much as to make them healthy and enduring.

While desirable, it is not absolutely necessary, that special quarters should be provided for the work of physical training in prisons. The main corridor, if well lighted and ventilated, will answer every purpose, and the developing apparatus required can be placed against the wall so as not to become an obstruction or interfere with the passage of prisoners to and from the shops.

Free movements, i.e. those performed without the aid of apparatus, serve a purpose, a preliminary setting up, as many criminal illiterates are so densely stupid as to be unable to tell the right hand from the left. It is not by means of the most elaborate apparatus that the greatest results are obtained.

Among the inmates of the Elmira Reformatory the greatest physical deficiency and least resistive power is found in the respiratory apparatus. Pigeon breasts, imperfectly developed chests and stooping shoulders abound. During a period of eight years, with 26 deaths, 13, or 50 per cent., were from diseases of the chest, not including affections of the heart. Upon more than one occasion, after a series of moral ups and downs incident to mastery of the lesson of self-control, it has seemed as if physical deterioration occurred coincident with moral and mental awakening. This physical decline cannot be charged to local surroundings, but is rather in accordance with the invariable law of nature that the strength of the weakest part determines the strength of the whole. The mental and moral struggle but brought to light the latent weaknesses of the physical man. Had it been possible for these young men and boys to have received physical education early in life their bodies would not have failed them at the time of mental development.

Our reformatories, houses of refuge and correction, and orphan asylums are the schools in which a class, not numerically small if physically so, are receiving their education. These children of the public are greatly in arrears physically, due to conditions they are in no wise responsible for, but if properly treated, possess capacity for improvement in comparison with their requirements. It is not sufficient to train them in habits of industry with attention to mental and moral needs; but of paramount importance is the systematic culture of the body, that is, exercise and training most suitable for individual requirements, systematized and carried out under the supervision of a competent teacher.

The actual demands of such a course need not interfere with the routine and discipline of any institution. Four lessons a week of a half-hour each, continued for a period of six months, will cause the caved-in abdomen, the half-used lungs, the pipe-stem legs and arms to match, the pimply and unhealthy skin to all recede before the evolution of the vigorous boy, well built and self-confident, whose brain is fed by rich and life-giving blood.

The reply to Maclaren of the soldier who had passed through a brief course of training at the gymnasium at Warley Barracks is as pregnant in meaning as many a sermon. "'I asked him if he felt any stronger for his practice?' 'I feel twice the man I did, sir,' was the reply: on my further asking him what he meant by that — 'I feel twice the man I did for anything a man can be set to do.'"

One hour per week at Radley College, with school boys under ordinary conditions of health and growth, was all that Maclaren required, and two hours at Bowdoin under Sargent's training produced results which, tabulated, showed as was never shown before, what systematized exercise could accomplish.

While one and two hours a week under ordinary conditions of mind, health and growth can bring about such results; and under a similar scheme is Hartwell at Johns Hopkins and Sargent in Cambridge working to develop body coincident with mind, that education may be of practical value; there are extreme cases of arrested mental and corporal growth requiring greater length of time. In the case of the criminal dunce and those not far removed from mental imbecility two hours a week are not enough. The material to work upon is not so promising or responsive as is the college boy. With my first class of criminal dullards twelve hours a week were none too many. They were in the beginning antagonistic to my efforts, and was necessary to put them daily through their paces, that the efforts of to-day might not be neutralized by the stolidity of the morrow. And the five months thus spent with them exclusively in physical and mental development yielded results that compensated for the time and labor, as the mind grew apace with the body, while the latter acquired a healthier tone.

The selection of a teacher is a matter of primary importance, calling for the same consideration as would be bestowed upon an application to instruct in mathematics or the rudiments of a trade. Not every broken down gymnast and tumbler is competent for the work of physical education, but the choice should fall upon a man who has comprehension of the physiology of exercise, discernment to perceive wherein his pupils are deficient, and possessed of broader ideas than the cultivation of muscle for strength alone.

The bath and dietetics remain to be mentioned as adjuncts to physical training.

Cleanliness, while essential to health in contributing to the proper performance of the functions of the skin and the maintenance of the latter in its reciprocal relations to other organs, is not the sole office of the bath.

Systematic bathing and massage stimulate the cutaneous system, raising to the highest degree of functional activity one of the chief eliminative organs of the body. The peripheral nerves are stimulated, and they in turn act upon their brain centres in accordance with the law of mutual dependence. In describing the psycho-physiological training of an idiot hand, Dr. Seguin noted the greater possibility of acting upon the centres, from the periphery than upon the periphery from the centres, at least in the period of growth.[3]

The ordinary tub bath contributes to cleanliness but fails to procure cerebral impress, as its workings are not sufficiently far-reaching. But more comprehensive in the scope of its action is the Turkish bath with its sweating room, cold plunge, needle, vertical and lateral shower, douche, and massage, with stimulation of the entire cutaneous system together with passive motion and articular exercise.

It may be urged that the Turkish bath is a decided innovation in the way of prison equipment, the first cost of which is virtually prohibitive. I answer that it is an innovation and the introduction of a means to an end that has not yet obtained in the work of readjustment of the criminal. Whatever advances have been made in the treatment of the malefactor were innovations at the time of introduction, in that they were departures from or elaborations of existing methods; and the community blindly committed to certain methods because no precedent exists in their midst for change of treatment, is incompetent to care for its derelicts and erring ones.

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3. Archives of Medicine, October, 1879, p. 155.

A modification of the Turkish bath to meet every indication can be effected at small outlay. Every institution has, or should have, a large bath room, well lighted and easy of access, with tile or marble floor. Such a room with but little labor can be furnished with appliances that for all practical purposes will permit of the giving of the bath. To existing water and steam connections the shower and douche can be attached, the same being readily made by the resident plumber, if he possesses ordinary ingenuity. Two or three radiators are usually in disuse or stored away, and these can be brought into service to furnish the vapor bath, or additional coils of steam pipe added to those already in service sufficient to raise the temperature to 120° F. or higher. In addition, a marble slab six feet in length by two in width, supported by legs, to serve as a table upon which to spray, douche and manipulate the subject, and the elements of the Turkish bath, minus the plunge, are at command; not so elaborate or costly as encountered in the cities, but answering their purpose in the work of physical training without interfering with the stationary tubs and the general usefulness of the room.

Noting the effect produced in individuals must determine the frequency of the bath, as no rule as to how often it may be administered without physical deterioration can be laid down, as each case must be a law unto itself, But it may be broadly stated that more criminals, and for that matter those in fair standing in society, have suffered to their detriment from too little rather than too great indulgence in the bath.

Under the operation of physical training I have found better work performed and results obtained when a special dietary was employed than when the regular prison fare was given without restriction as to quantity. The object of food is to furnish nourishment to the body and energy to perform well the work in hand. The pleasures of the palate are but a stimulus to the proper nutrition, whose gratification largely in excess of the needs of the body leads to mental and physical hebetude. In the physical training of the criminal, with all the opportunities afforded for controlling his vicious habits and tendencies, the sensuous demands of taste should be held in check, lest the stomach get away with the brain. A writer has recently observed — " The abdominal muscle is the test of condition. Some people never control it, and from youth to age the belly leads the man. When the abdominal muscle gets the better of a man he has said good by to his athletics." [4]

Dr. Fothergill has truly said — "To swallow food and to digest it are not one and the same. It is what is digested — not merely what is eaten — which has to do with nutrition."

The quantity of food necessary to maintain a good physical condition bears a relation to the work performed and the individual. An arbitrary rule cannot be laid down; we must be content with an approximation, bearing in mind the fact that the motive power of different individuals will not accomplish with the same amount of fuel the same amount of work.

It has been wisely said — "The appetite of youth needs not the stimulus of food tempting to the palate." The writer might have added, it is better to cease eating before satiety is reached than to continue till a sense of oppression is produced. The average man or boy, if left to his own inclinations, will eat largely in excess of the needs of his economy until fatness and softness are produced, which, as O'Reilly observes, are symptoms of disease or sensuous expression.

Plain, unstimulating food, with a proper combining of animal and vegetable matter, is indicated.

With boys in the plastic age, and especially those in training for physical betterment and mental strengthening, I would protest against the routine use of tea and coffee at the evening and morning meal, usually of such a strength as to be a stimulant. Milk should enter into the dietary, being regarded as a solid food rather than a beverage — a pint of rich milk being nearly the equivalent in nutritive properties to a pound of steak. In bread and butter and milk there is contained all the elements requisite for life and energy. Starch as body fuel; albumen for tissue; repair in the gluten; earthly salts, especially if the bread be made of whole flour; and the butter, the fat, which partly is burnt as a body fuel, partly engaged in the building up of a healthy tissue. [5]

The work of physical education, to be successful, should be carried on in a three-fold line; physical development, muscular amplification and structular enlargement, not mere increase in size but increase in structure, to arrest defects transmitted or acquired through environment or defective modes of living; the bath as a stimulus and means of bringing the various members of the body into greater harmony; and a dietary suitable to supply energy of the kind best adapted to the adjustment of mind to body.

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[4] Ethics of Boxing and Manly Sports. John Boyle O'Reilly.

[5] Manual of Dietetics. J. Milner Fothergill, M. D.

The primary education of many criminals and defects should be the education of the body and the building up and strengthening of the brain. To force or develop a brain whose habitation is attentuated and architecturally unharmonious, whose nervous system is vitiated, is to produce a mental dyspeptic, who, while he may, by the brightness of his work, give evidence for a time of promise, yet under the pressure of so-called education and contact with the crowding world his course is like the flame that flickers and gives an increased light before it dies down and is extinguished.

The mental foundation of such an one is builded upon the sand and not the enduring rock. Poorly fitted for the work of life and embarrassed physically, when the day of tension and trial comes it finds the mind crammed with scholastic lore and moral platitudes in excess of its physical strength, ill prepared to meet the exigencies of the hour; and a lapsing back into a condition sevenfold worse than the first state, or insanity and suicide, as in the case of the poet Chatterton, terminate the scene.

But first let the scheme of training or reformation embrace the bringing to the highest attainable degree of perfection the physical man, and coincidently the brain will participate in the work of physical improvement and the mind, mellowed and secure upon a firm and enduring basis, will afford a soil wherein the germs of morality and principles set forth in the decalogue may find lodgment and fructify, bringing forth in good season fruit, it may be ten, twenty or an hundred fold; an accomplishment that in physical and mental crudeness could never have been brought about through appeals to the emotions.

THE USE OF THE SPHYGMOGRAPH IN THE PHYSICAL EXAMINATION OF GYMNASTIC WORKERS AND OTHERS.

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Probably no scientific instrument has created much less enthusiasm in the medical profession than the Sphygmograph.

There are several reasons for this lack of appreciation on the part of physical examiners and practitioners of medicine.

In the first place the instrument is comparatively young, and youth is seldom appreciated. In the second place the instrument is small, and like a small man in a crowd has this disadvantage to contend with. Third, and of great importance, to ascertain with any degree of certainty, facts regarding the condition of the heart and circulation of the blood with the Sphygmograph, considerable experience in its use is necessary.

With these facts before us the question is practical:

Does it pay to spend any time with this instrument?

To answer this question let us ask three others:

1st. What has been accomplished with the Sphygmograph?

2d. How can the Sphygmograph be used by the examiner of gymnastic workers and others with practical results?

3d. What methods of taking and preserving tracings are most practical?

It is not the object of this paper to give an account of the invention and construction of the Sphygmograph. Thanks be to such men as Marey, Mahomed, Pond, Dudgeon, Keyst and others, who combined mechanical ingenuity with careful study, developing an instrument that records fairly accurately the story which the pulse writes of itself. Although neither the tape measure, the stethometer, the spirometer or the sphymograph are perfect, yet the records obtained by their use are more valuable and permanent than the evidence derived by sight, touch or hearing. Few men, if any, can retain observations by these latter methods, while those by the former can be recorded and kept for future comparison. The Sphygmograph has made it possible to record the force, frequency and regularity of the heart's action, leakage or stenosis of the valves especially, the aortic and mitral, and to some extent the condition of the arteries and capillaries.

Marey considered the crude instrument which he constructed as of utmost importance in physical diagnosis. In 1867, Dr. Burden Sanderson in his "Hand Book of the Sphygmograph," detailed the construction and use of Marey's instrument modified. He named one point of great importance in sphygmographic work, viz: that both the arm and instrument be held steady while a tracing is being taken. Dr. Sanderson made a very complete analysis of the pulse and describes the elements to be determined in every observation as follows:

1. Relative duration of the systole and diastole.
2. The duration of systolic tension and the interval between it and the diastolic tension.
3. The intensity of the systolic and diastolic vibrations.
4. The effect of varying the tension of the spring of the Sphygmograph.

In the same work of Dr. Sanderson is printed a lecture of great value given by him at the Royal College of Physicians, London, on the "Mode and Duration of the Contraction of the Heart." We cannot attempt to review this valuable treatise, but merely refer to it, culling one sentence of particular interest, viz:

"Let us remember that no theory ought to be applied to the issues of practical life, until it has been subjected to scientific criticism, and received as a scientific truth."

Some years later, a prize essay was published by Dr. Edgar Holden, upon the physiological and pathological indications of the sphygmograph. This essay was awarded the Stevens Triennial Prize by the College of Physicians and Surgeons of New York in 1873, and is rich in experimental work and results. In drawing conclusions, Dr. Holden remarks that "a deeper meaning probably lies in the tracings than has yet been revealed;" and if the reader will bestow the requisite amount of patience upon their study, the appearance of similarity will vanish and the assurance that both the pathological and physiological indications afforded by the instrument are of great importance, will seem well founded.

In 1882 a small book was published by R. E. Dudgeon of London, on the "History and Use of the Sphygmograph as an Aid to Diagnosis." When we become disheartened in our work and wail because we can present nothing new about the human body to our fellow workers, let us remember the story of Herophilus (as related by Dr. Dudgeon), who dissected alive 600 human beings and only reported that the arteries pulsated, but did not even state what they contained. With this in mind, and also remembering how Galen was laughed at and how Harvey struggled only four centuries ago to convince even the scientific men of his day that blood circulated as it does, we need not wonder that so recent an invention as the sphygmograph has not been universally adopted, or that this paper presents but few conclusions.

Of late works, that of the late Alonzo T. Keyt, of Cincinnati, contains some valuable suggestions and results regarding work with this instrument. (G. P. Putnam's Sons, publishers.)

We cannot attempt a review of the work of these men in this brief paper, but can, I believe, make a few statements which are open to criticism by anyone who has in a careful study of the pulse taken at least 2000 tracings:

In this connection the tracings of Plates I and II should be noted.

No. 1 shows a normal sphygmogram.

No. 2 is almost normal. except that the tidal wave is high. (See No. 4.)

No. 3. Pulse of high tension.

No. 4. A dicrotic pulse seen in cases where the stethoscope reveals large aortic valves.

No. 5. Weak pulse.

No. 6. Irregular pulse.

No. 7. Pulse of hypertrophy and dilatation, the latter predominating.

No. 8 shows one form of irritable heart of smokers.

No. 9 shows an irritable condition seen in excessive coffee drinkers.

No. 10 shows a weak, nervous pulse in a man who, when examined, was drinking two cups of tea three times a day.

No. 11. Pulse of same man one week later after drinking only one cup of tea daily.

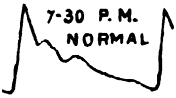
No. 12. Pulse of same man two weeks later, having drunk one cup of coffee daily for breakfast instead of tea for one week.

First — Let us study briefly the normal pulse tracing.

We will give what we believe to be the story of the sphygmographic needle during one cardiac cycle. (See Plate 1.)

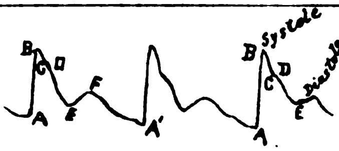
All scientific investigators agree that the line A—B represents the cardiac contraction, the impulse being conveyed to the needle

PLATE I.



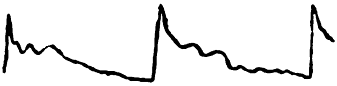
Robson 12-22-1888.
7-30 P.M.
NORMAL

1.



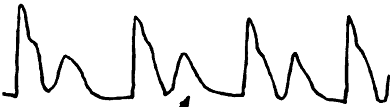
2.

6. S. 11-29-1888-3·30 P.M. P



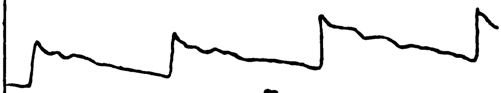
3.

21-S 11-10-1888·3·28-P.M. P3½.



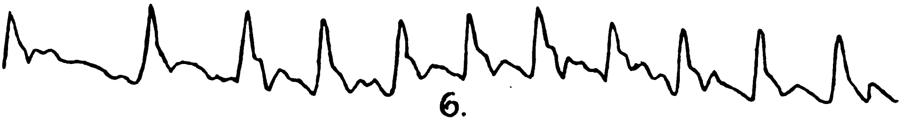
4.

14-M-12-10-1888. 10-40 A.M. P3½



5.

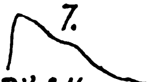
7. M 12-14-1888 10-50 A.M P2 3/8.



6.

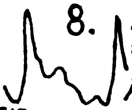
Bissel 10-16-1889. 8-A.M. P. 3¾.

PLATE II



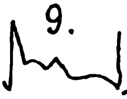
7.

P2¾ Dil & Hypert



8.

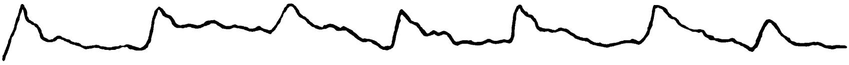
smokers
irritable
12-23-1888.
P.2⅜. 11-30 AM.
Will N. 6 Cigarettes a day.



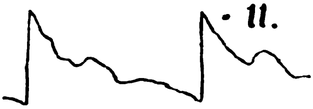
9.

Callender
12-25 1888.
22-C-8-40 AM.

10.

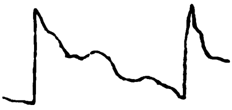


22-H. 1-11-1889- 4:15 P.M. P. 3. 2 cups tea t.d

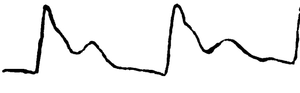


11.

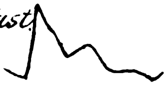
22-H
1 cup Tea Breakfast.
Less nervous.
Jan. 18. 1889..4:20 P.M.
P.3.



12.



1 cup Coffe Breakfast
Less nervous
Sleep better
Jan. 25 1889.
P.3. 4:30 P.M.



through the arteries in the same manner that the impulse is given to the last marble in a row of marbles by striking the first marble in the row a quick blow, the difference being that the row of marbles does not advance, while the blood current does to some extent. This ascent we will call the systolic wave.

The arteries thus suddenly filled begin immediately by virtue of their elasticity to contract and the needle descends to the point C. Next we have a wave, the cause of which is not definitely settled. Holden and Burdon Sanderson, Landois, Kirk and various physiologists discuss varied opinions. From a close study of these opinions, and about 2600 personal observations of men in different conditions in the gymnasium, I am inclined to believe that the wave C –D called the tidal wave is due to a rebound of the blood from the terminal vessels or capillaries, for the following reasons:

The tidal wave is more perceptible nearer the capillaries.

The base of tidal wave approaches the systolic line and systolic apex, the farther the tracing is taken from the heart.

Sweating renders the tidal wave less perceptible and the base nearer the dicrotic notch.

From D the artery again contracts till the needle reaches point E. The line E—F is generally conceded to be due to the rebound of blood from the closed aortic valves and is usually termed the dicrotic wave. The remainder of the cycle to A represents the diastole or rest of the heart.

Beside then the upstrokes of the needle we have to study the systole or work of the heart represented from A to E, as compared with the diastole represented from E to A.

Thus much has been established by patient work of careful scientific observers.

This leads us to our second question:

How can the Sphygmograph be used by the examiners of gymnastic workers and others with practical results?

This may be answered by noticing (1st) the causes that influence the systolic, tidal or dicrotic waves; (2d) what changes the proportion of the systolic to the diastolic portion of the cycle? and (3d) how do these facts aid us in prescribing work for those under our direction?

The systolic wave A—B is increased by:

1.—Sudden and forcible contraction. 2.—Large amount of blood (unless heart is weak.) 3.—Elastic artery. 4.—Small amount of pressure.

The systolic wave is decreased by:

1.—Feeble or gradual contraction. 2.—Small amount of blood. 3.—Hardened arteries (unless heart is hypertrophied.) 4.—Increased pressure of spring. 5.—Mitral regurgitation or aortic stenosis.

Tidal wave is increased by:

1.—Slow contraction. 2.—Large volume of blood. 3.—Capillary obstruction. 4.—In cases where an arterial murmur is heard, (mentioned by Dr. Seelye, of Amherst, Mass., in Medical Record, Nov. 5, 1887.)

Tidal wave is diminished by:

1.—Sudden contraction. 2.—Small quantity of blood. 3.—Capillary obstruction.

The dicrotic wave is increased by:

1.—Sudden contraction of ventricle. 2.—Capillary obstruction, 3.—Relaxed muscular coat.

The dicrotic wave is decreased by:

1.—Gradual systollic contraction. 2.—Capillary dilatation. 3.—Contraction of muscular coat of the arteries. 4.—Aortic insufficiency.

This classification is offered, not as entirely original, but as partly so, and partially culled from the experience of others.

Further than this the sphygmograph shows the relation of heart work to heart rest. The following statement is made, not upon authority of others, but ventured from observations upon gymnastic workers in various conditions.

Work of heart is increased by all forms of physical exercise. Most by:

1.—Heavy work. 2.—Quick or violent light work. 3.—Contest work (races, tug-of-war, &c.) 4—Exercise with rigid or constricted chest. (Famous march—see page 42.) 5.—Exercise after eating heartily. 6.—Sprint running. 7.—Running or other exercise till: (*a*) Second wind is established. (*b*) Perspiration is free. (*c*) While bathing and dressing after the exercise. 8.—Exercise with faulty or no training. 9.—Exercise when heart is weak and dilated. 10.—Organic heart lesions, especially of mitral and aortic valves.

Work of heart is increased by all forms of physical exercise. Least by:

1.—Light exercise taken moderately. 2.—With chest free from constriction. 3.—With chest elastic. 4.—Two hours after or before eating. 5.—Running: (*c*) After second wind is established. (*d*) While prespiration is free. (*f*) After rest. 6.—After gradual and careful training.

These statements are made from observations of men doing different exercises at the same time each day under as near as possible the same conditions. For instance, (see Plate 3) at 5 P. M. on successive days one man would come to the gymnasium and practice, the first day on the parallel bar, the second on the horizontal, the third with one iron dumb bell of four pounds weight, &c., a tracing being taken before and after the exercises each day. In this way we studied the effects of the same exercise on men in different physical condition, the same exercise at different times during the day; the same exercise with the chest constricted by tight clothing (see plates IV and V) and the diaphragm obstructed by a full stomach pressing upward. (See Plates VI and VII.)

The effect upon the heart was the same whether chest capacity was interferred with by a naturally rigid chest wall, a full stomach or a tightly-buttoned coat or tight bands. This affords us a conclusion or considerable value and importance, viz.: never allow gymnastic workers to exercise while the body is constricted by a belt, discourage exercise just after a meal, and do all possible to increase the elasticity and expansion of the chest in all the exercises taught.

Ladies' gymnasium suits should be made with loose belts about the waist.

Unfortunately I am unable to show you photographs of observations with constrictions of the chest in either of the three ways mentioned. The facts are these, that with constriction (1) arterial tension was increased both before and after the exercise; (2) irregularity of the heart occurred more frequently after exercise than when the chest was free; (3) the work of the heart was greater, the ventricle in some cases appeared to be so engorged with blood that the tidal wave continued persistently above the systolic wave.

A fearful illustration of the effectiveness of this chest restriction is seen in the fatal march at Chin-Kwing-Foo, quoted by Dr. McLean (British Medical Journal for 1867), in connection with the "cardiac variety" of sunstroke.

Four regiments landed and ascended the heights in an intensely hot sun. The Ninety-eighth marched with coats buttoned tightly and many of its members dropped dead by the way; whereas, the other three, Eighteenth, Forty-ninth and Fifty-fifth regiments, equally exposed and with other circumstances the same (except loose coats), did not loose a single man from sunstroke. Death there was supposed to have been due to sunstroke, but could the needle have traced the pulse we would doubtless have seen, first, a short systolic wave, then an exagerated tidal wave followed by irritability, irregularity, intermittency and paralysis. Mr. Myers of London makes conspicuous (Alexandrian Prize Essay, 1870,) two other causes which are quite similar, viz.: "Too early enlistment," or "too short a period of training." Dr. DaCosta, in a careful analysis of 200 cases of cardiac irritability among soldiers, considers 34.5 per cent. as due to excessive marching. It is a fact to day in civil life that many athletic and gymnastic workers come to the physician with irritable, palpitating and hypertrophical hearts as a result of no direction in their work and many times, to our discredit, poor direction.

Three cases may be cited as examples of over-work.

Case 1.—Mr. S. came under observation October 10, 1888. (See 1 and 2, Plate VIII.) Three years before he had begun work in a large New York gymnasium. No preliminary physical examination was given and no direction but "help yourself" was given. He had been book-keeping for twelve years and now began vigorous exercises with heavy iron dumb bells, long distance running, &c. At the end of the second winter he was miserable with an irregular and palpitating heart. His doctor advised him to stop gymnastic work, which he did entirely in the spring of 1887. October 10, 1888, the examination showed some cardiac hypertrophy and, after the strength test, irregularity. At this writing he has been exercising regularly with chest machines, light wood dumb bells and other light gymnastic apparatus without any appearance of his trouble and with a good deal of improvement in general health. (See tracing of case in Plate VIII, No. 1, taken before exercise, No. 2, after.)

Case 2 is that of another gymnast who had done little als efor the past few years but train for short distance races. He had never been examined or cautioned about over-exertion. He has had no bad symptoms, but examination, October 7, 1888, showed some cardiac hypertrophy and, after the test irregularity. Whether he persists in spasmodic training or not remains to be seen. The fact is the same, however, the sphygmograph showing high tension and a a strong systole with the systolic portion of the cardiac cycle lengthened. (See Plate VIII, No. 3 and 4.)

CASE 3.—Mr. R., a dentist, had done no physical work until the Spring of 1887, when he began quite hard work on a farm. This was continued all summer. Last winter he had some palpitation and irregularity of the heart, and has suffered more or less since. His general condition is not good, there being bronchial breathing, voice and whisper over a limited area at the right apex. He has begun a system of light gymnastics with a carefully regulated diet. Examination October 15, 1888, showed cardiac dilitation, the tracing showing low tension with some irregularity and weak systole. (See Plate VIII, No. 5 and 6.)

These cases show the importance of a careful examination of gymnastics workers and of careful, intelligent direction. The sphygmograph detects early any irritability, irregularity or weakness of the heart's action or high arterial tension. We must not depend on this instrument alone for diagnosis of hypertrophy or dilitation, for there may be other causes to raise or lower the systole wave. (See page tracings.) If, however, we use this instrument in conjunction with the stethoscope and other instruments an accurate diagnosis is certain, providing we have a fair knowledge of the anatomy and physiology of the chest and the diseases which concern the heart and circulation.

To estimate the effect of exercise on a man beginning work:

Take a tracing of the radial pulses, examine with the ear and stethoscope the heart and lungs.

If no organic lesion exists, subject to pull up, dip and dynamometer test. Now, repeat the same examination. In this way, with careful observation of our men at intervals, we can render valuable advice and sleep with a clear conscience, knowing, at least, that we are not injuring any man by our hasty or over-enthusiastic advice.

What Methods of Taking and Preserving Tracings are Most Practical.—According to the old method (taking the tracing on paper, glazed on one side, the glazed side having previously been smoked over camphor), more than one sphymographic tracing can seldom be taken illustrating the point under consideration. Many times one wishes to group these tracings in different ways for study.

To accomplish this purpose I have tried various methods, using mica, oiled paper, etc., but with little satisfaction. Finally, however, I tried gelatin plate with good results. This can be purchased in large, thin sheets, and cut into plates (for Dudgeon's sphygmograph, $\frac{11}{16}$ inch wide and six or more inches long). These plates are smoked in the usual way, care being exercised not to burn the gelatin. After the tracing has been taken, numbered, and properly labeled, it is treated to a bath in compound tincture of benzoin, or better some light-colored varnish. When it is thoroughly dry we have a negative which can be used repeatedly *a la* photographer. If one wishes to photograph a person before and after certain periods of gymnastic training, corresponding tracings taken in this way can also be photographed without destroying the original. A simple method of grouping tracings is available by using ordinary blue print paper, such as is used by architects and designers. Five minutes' exposure to bright sunlight is sufficient to develop a distinct blue line on a white ground, which is made permanent by immediately immersing the paper in water for the same length of time. The same paper, differently prepared, will develop a white tracing on a blue ground. The blue ground or margin can be utilized for notes or labeling by simply writing the same with a saturated solution of sodium bicarbonate. In these ways sphygmographic tracings can be grouped and preserved indefinitely for reference, writing, or study.

The gelatine negatives may be utilized in photo-mechanical printing processes, in the Woodbury type process, and in photo-lithography.

This method of recording tracings renders the sphygmograph more practical and useful, especially in a careful study of physical diagnosis. To be sure, the story written by this little instrument is not absolute, but if properly used it speaks of truths which lie unwritten within the thoracic cavity. Scores and hundreds of tracing which have been thus taken and recorded serve to prove that considerable careful training is necessary to enable the heart to act normally when more or less severe exercise is undertaken. They show also that the physical director should carefully observe his men and adapt the exercise to the individual, instead of putting every man through the same routine.

So far as I have been able to ascertain, the men who have suffered from the effects of athletic exercise have been more frequently men of a certain delicacy of fiber than those who were brawny and muscular; or in either case men whose previous "training" was insufficient or too hasty; who have resorted too frequently to cardiac excito-motors and not enough to sleep; or, in a few cases, men who have allowed their enthusiasm to exceed the bounds of reason.

The heart itself is a muscle, and the vessels which issue from its cavity are surrounded by muscular bands.

Three things are necessary to promote the advantages and inhibit any evil influence of athletic exercise upon the vital organs, viz.: 1. That "training" be commenced early, be more gradual, and extend over a longer period (at least seven to nine months before any contest). That the "training be directed by a practical physiologist," who knows the condition of each man in charge. 3. That the supporters of our college and association gymnasia make the salary of the physical director such as to enable him to give up his whole time and energy to the study of his profession. If, then, training (preceded by a thorough physical examination) be commenced gradually and carried out systematically, it will be the means of strengthening the muscles both of the heart and vascular system in a degree proportionate to that in which it develops the voluntary muscles. Such a proportionate and healthy development is normal and is to be desired for hearty vigorous living. Athleticism of the past is becoming modern physical education. It is impossible tc doubt that many circumstances of the present day, especially in our larger towns and cities, tend to weaken both men and women.

These depressing influences, as population increases, must tell with augmenting effect. To counteract this tendency, every game, every pastime, and every variety of exercise tending to make men more muscular, stronger and healthier, is deserving of encouragement. The time and medical skill bestowed in patching up the most confirmed invalids doubtless prolongs their lives and is in harmony with the humane sentiment of the nineteenth century; but, in the interest of the state, such must be regarded as a national calamity.

Transmitted and inherited disease degrades civilization and makes families miserable. The principles of physical education are intended to combat these baneful inheritances; improve and strengthen the human stock. Gymnastics form the practical part of "physical science." The gymnasia of our universities and associations are being placed in the hands of the medical profession. The field for care-

ful investigation is a broad one, and it is be hoped that men will be ready with sound physiological and hygenic ideas to give their time and energy and careful study to this work of promoting health and aiding their profession.

THE NEW ATHLETICS.

BY JOHN S. WHITE, LL. D.

Until recently we could not be said in America to have any national system of gymnastics. The movement for the better physical education of the masses has been sporadic and inefficient. The system of heavy gymnastics introduced by Dr. Winship, of Boston, 20 years ago, produced a limited number of overdeveloped athletes, who could raise to arm's length a dumb bell weighing 225 pounds, who could toss a barrel of flour into a cart, and who could lift a ton and a quarter with a machine attached to their shoulders. The other extreme of Winship's methods was the system of calisthenics, or light gymnastics, devised by Dr. Dio Lewis, whose name will surely hold a very high place in the annals of physical training and in the educational system of America, for to no one individual more than to him is due the credit of stimulating a keen and abiding interest in physical exercise. Following Dr. Lewis, with methods that are much more thorough, systematic and far-reaching, came Dr. Edward Hitchcock, of Amherst College; Dr. D. A. Sargent, director of the Hemenway gymnasium at Harvard University; Dr. Watson L. Savage. director of the Berkeley Lyceum; Professor Hartwell, of Johns Hopkins University; Mr. William Blaikie, and a few others, whose expert judgment in the training of youth at all ages, as well as of maturer individuals is beyond value, and whose success in the correction of physical deficiencies by gymnastic training has been marked and progressive. The result attained by these experts will shortly give to us a national system superior to any ever before devised. The essential principles of the new gymnastics, as stated in Dr. Savage's words, are these: "All exercise, to be truly beneficial, must be adapted to the individual by competent judgment, and apparatus must be provided which shall afford ready means for the correct development of every muscle of the body."

Sterne says: "The body and the mind are like the jerkin and its lining; if you rumple the one you rumple the other." In this bit of wisdom lies the gist of the whole matter. The scholar, the preacher, and the business man, in this driving metropolitan life, will speedily break down unless he recognizes the fact that the constant drain upon his nerves and the trituration of the tissues of the brain must be balanced by regular and judicious exercise. Charles Kingsley said of the Greeks: "Their notion of education was to produce the highest type of health — that is, harmony and sympathy and grace in every faculty of mind and body;" and so closely upon a par did they place the action of mind and body that their commonploce definition of an "ignoramus" was "a man who could neither read nor swim;" and tho Persians swung the balance far off to the side of bodily care, for, says Herodotus, "from their fifth year to their twentieth the boys were carefully taught three things only — to ride, to draw the bow, and to speak the truth."

For the new era of athletics I should set this primary and crucial test: All physical exercise to be beneficial, must have in it the element of fun. Schiller even declares that the "play-impulse" in human nature is the foundation of all art. If you recommend dumb-bells to a man seeking development for the chest and arms, you will merely impose upon him a few unhappy hours of unfruitful occupation (for he will drop the exercise in disgust in a week), and you will prejudice him forever against your methods. Advise walking or horseback riding, and give him no companion, and you will fail just as soon of improving his physical condition as in the other case. But let him engage in any real sport presenting the elements of enjoyment and a desire to win, and the exercise will immediately become its own advocate. Two thousand books have been written upon the use or misuse of the digestive organs, and nobody reads them. Possibly ten books have been written upon physical education and they are eagerly devoured. No system of class instruction in the gymnasium can be successful, either with adults or with children, unless the exercises are done to music and with a military or dance step. In other words, the exercises must seem to be play and not work.

It is peculiarly appropriate in ihis connection for me to call your attention in a practical way to such of our national sports as may deserve special commendation or criticism. Baseball — the most truly American of sports and the finest game in the world for boys — a grand inheritance from our copper-skinned predecessors; cricket — that splendid exotic which steadily refuses to be transplanted into the hotbed of our versatile American life; running, jumping throwing the hammer and pole vaulting — these need no champion; but so much criticism has been brought to bear, in one way and another, against tennis, rowing and football, that they merit at least and impartial judgment. One of the New York periodicals recently opened its pages for the discussion of the various kinds of physical exercise, and two contributors, a physician and a professional pedestrian, took up the cudgel for their respective hobbies. One claimed that horseback riding, of which he was personally very fond, was the best exercisese in the world for men, if not for women. The other naturally favored walking. But they united in the statement that lawn tennis was an unmanly and injurious sport. One claimed that it was babyish; the other that it produced the disease known to physicians as the "tennis arm."

It is a pity that such a comment should ever be made upon that sport which combines more of the qualities essential for permanent health and the training of all muscles of the body than any other game which has ever been invented. The only criticism of any weight that can be brought against it is that it develops the muscles of the right arm more than those of the left; but every exercise has the same tendency — cricket, billiards, baseball, or lacrosse, to fully as great an extent as tennis. Let a player secure his left arm to his side so that he cannot move it freely, and he will find it impossible to play the game. Only one exercise in the world can be said to be perfect in this respect — of securing the development of the muscles of both sides of the body to the same degree — and that is rowing straight forward with two oars, in a boat having no rudder, where there is no current and no wind. It is self evident that in order to propel the boat in a straight line under these circumstances, the same effort must be made by each arm and that the muscles of both sides of the back will be strengthened with absolute equality.

In the game of lawn tennis the strain is so short in the effort to reach and return the ball, that persons of all ages can play it without injury or excessive weariness. The back, the loins and the lower limbs are exercised practically to the same extent. Being a game of skill, there is no limit to the proficiency which can be acquired, so the game can never lose its popularity. Both the essential elements of pleasure and honorable contention are always present, whether in a game of two persons or four; and as there is, in common parlance, "no money in it," lawn tennis will never be encroached upon by the professional element, but will always remain peculiarly a game for amateurs. The game can also be enjoyed by beginners, and is therefore suitable as a means of exercise for the greatest possible number. But the best of all arguments in its favor is that women can participate in the sport to the same extent as men; and, I need not add that for the last reason it is the most conducive of out-door sports to courtesy and good manners. Let the carper at lawn tennis spend an hour or two on some pleasant autumn afternoon watching the players upon the beautiful turf courts of our various athletic grounds, and let him note the keen enjoyment manifested by all the players, their courtesy toward each other and the flush of health on every face, with never a suggestion of discontent or exhaustion, and his prejudice will speedily vanish — nay, I believe he will at once experience a change of heart.

Rowing, or still better, canoeing, must be ranked among the very best forms of outdoor exercise. But the rowing of races and the excessive training necessary to success in a close and prolonged contest can by no means be recommended to the same extent, nor are they open as a means of exercise to any very great proportion of a college or athletic club. But short boat races, like short running races, are above criticism. The practice of rowing races over a four-mile course is greatly to be deplored. The fashion appears to have originated in imitation of the contests in England between the 'Varsity crews of Oxford and Cambridge. But these races are rowed on the Thames, with a strong downward current, so that the time and physical strain are thus greatly reduced.

In a circular letter issued by an inter-collegiate athletic conference held in New York city in 1884, are these words: "Nearly every college boat race has been won at the end of the third mile. The result has been a 'procession' for the fourth mile, or a desperate attempt on the part of the defeated crew to retrieve themselves. The consequent tendency has been to lessen the interest in college boating, or to injure the health of the participants by over-exercise and heart-strain. The style of rowing for a four-mile race is essentially different from that of a two-mile race, and requires different qualifications.

"*Resolved, therefore,* That no intercollegiate boat race should be for a longer distance than three miles.

In reply to a question which I addressed upon this point to several prominent college boating men I received an almost unanimous response that a boat race ought never to exceed this limit. One stated that in a four-mile race, before entering upon the last quarter, the rowers are, as a rule, absolutely exhausted. They almost lose consciousness of time and place, and their motions become purely mechanical. It seems impossible to them to row a dozen more strokes. Incessant encouragement is necessary from the coxswain or from the shouts of the spectators to enable them even to keep their senses long enough to finish the race. Of course these statements do not apply as closely to the crew which is in the lead, since for that very reason their powers of endurance have not been so severely tested. One believer in long distance rowing objected that he, personally, never reached the point of exhaustion. "But," said I, "I believe you were a member of the Harvard freshmen crew of 1875, and can you tell me why you lost the race to Columbia?" "Oh, we had the best of them all the way," was the reply, "but, unfortunately, our strongest man fainted just at the end of the third mile."

It is a matter of much regret that the recommendation of the athletic conference failed of the concurrent adoption of five colleges, and no subsequent attempt has been made to secure an intercollegiate athletic code, either in reference to rowing or other contests.

The same objection may be forcibly brought against long-distance bicycle racing. One mile should never be exceeded by contestants under 20 years of age.

When I said that all games of permanent value must possess the two elements of "fun" and "honorable contention," I might have added that a game, to be permanently attractive to the athlete, must have in it also the element of danger. The modern reader will never lose his facination for the Field of the Cloth of Gold, the Knights of the Round Table, and their deeds of derring-do, so long as he is human and manly and courageous. It was not that men and women held life less dear than now; but honor, bought at the price of life, filled a higher niche in their hearts than a cowardly existence without it. It is difficult to understand how a mother could so bravely bid good-by to her boy, not yet of age, as he set off upon the perilous expedition to recover the Holy City from the Saracens; or how a girl would permit her lover to enter the lists to ride in the tournament to certain danger, if not death. But personal bravery and physical prowess have always won the respect and admiration of women and men, and we cannot tell how much those splendid chivalric days, false, perhaps, in fashion and reason, but shining with brave deeds, have contributed to that basis of character in the Anglo-Saxon race which makes their descendants famous for pluck and endurance to this day.

Of all our athletic contests, only one replaces in any sense the mediæval tournament in its salient features — the hardening of the muscles, the training of the powers of endurance, the sense of danger to limb if not to life, and the stimulus to deeds of courage amounting almost to exaltation — and that is football. The penalty of greatness is criticism, and football, whose ardent admirers claim it to be the greatest of all games, does not lack this qualification, for its enemies are legion. Sorry will be the days for the boys of America if ever football should be ousted from its high place of honer among the best of their sports. It is the grandest of all tests of activity and muscular endurance, fineness of spirit and self control. It demands the shrewdest tactics and the ablest generalship; the noblest humility in victory, the best philosophy under defeat, of all contests, short of actual warfare, which are open to the boy or the man, "Of all athletic sports," says Sargent, "football is the best game to test a man physically. In the pushing and hauling, the jostling, trampling struggle for supremacy, few muscles of the body are inactive. The legs are almost constantly in motion, and the arms, chest, abdomen and back get their share of activity; the lameness and soreness in these regions of the body after a fierce contest is due as often to great muscular effort as to collision with opposing pushers. In spite of the accidents attending this game, as at present played, no sport affords better opportunity for vigorous training. "If I am ever called to lead a force of men in defence of my country," says the staid Professor Luther, of Trinity College, "I want to ride against the enemy behind a regiment of men who have met and fought, earned victory and suffered defeat on the football ground, and I shall know that when I face the foe on fairly equal terms, nothing short of superhuman power can conquer me!" What really matters an occasional bruise, or even a broken limb, when you cultivate in the football player, a toughness of muscle, a presence of mind in sudden danger› a quickness of thought in emergencies, a discretion in the face of overwhelming odds, and a dexterity of limb and motion, which, without any doubt, will prevent in the after life of a player a thousandfold more accidents than he can possibly meet with on the football field. The trained athlete is not apt to sprain his ankle by a false step from a street car, or wrench his back by the lifting of an unusually heavy burden.

It is high time that a more generous attitude be shown by the community toward the athletic sports of the college and the school. Let us put upon the shelf, once for all, the time worn jest that the boy goes to college to learn to row and play ball. Some excess there is in this direction, something of overtraining and neglect of studies on the part of individuals, but where one man receives injury or devotes overmuch time to sport and physical exercise a hundred average men receive inestimable benefit from the added stimulus to a more intelligent comprehension of the laws of health, and a wiser care of their own muscular development which the single overt example has awakened.

Statistics show that the average length of life of college graduates is greater than that of other men in nearly similar conditions, and that dissipation among the unprincipled men in college is greatly diminished by athletic training. Somebody has defined all crime as disease, and certainly morbid dispositions do not exist in perfectly healthy bodies.

But do not stop with your encouragement of sports for boys. Do yet more for the girls. There is a reason why the girls of 16 in America are taller and more robust than their mothers. We can trace it directly to more intelligent ideas of dress and open-air exercise, to horseback riding and to lawn tennis.

Increase these opportunities and let the girls play hockey and cricket — as, indeed, they are already doing in the English schools — let them fence and shoot and swim, but above all give them gymnasiums in every city and town in the land.

I hail with enthusiasm the athletic spirit of the present time, and I prophecy that before many years our American young men and women will show a robustness and vigor of constitution, and a familiarity with the best forms of physical exercise, both for the training of the muscles and the maintenance of health, unparalleled since the days of Plato, the mighty wrestler; Socrates, the invincible soldier, and the magnificently trained boys and girls of the Dorians, in ancient Greece.

The man of the future is to be a man of action, and he must have big lungs, brawny muscles and a constitution of iron. Already the pessimist is asking: "Where today are the counterparts of the great statesmen, orators, poets and painters who have in past days studded the sky of history with the jewels of their intellect?" My reply is: "They are here, but this busy age of evolution has claimed them for other work; they are factors of a new and higher civilization, and art, for the nonce, must yield to utility."

Your Chathams, your Harry Vanes and your Websters are managing colossal railroad systems stretching their lines of steel thousands of miles into the wilderness, and demanding the best energies of 50,000 men.

The Galileos, the Newtons and the Franklins have chained the lightning, and are illuminating the world with its majestic energy. The Shakespeares and the Miltons, the Raphaels and the Rembrandts are standing today at the bar of nations, pleading causes whose decisions make the world to tremble, or wielding a pen through the pages of marvellous newspapers and magazines mightier than the sword of Alexander or Joshua; or wearing a mitre and a robe whose potent sway reaches to the uttermost parts of a great land — not as through the enforced and narrow tenets of former days, but by the subtle, golden influence of a broad Christianity.

The fundamental principle, then, of the new physical education is this; aim not to produce great athletes, who can lift vast weights or hurl a ponderous hammer, while the multitude go untaught; but endeavor to train every individual to the highest symmetrical development, and the maximum of health and physical beauty of which nature has made him capable. Let Hercules stand aside for Apollo!

NAMES OF MEMBERS.

Prof. J. W. Abernethy, Ph.D., Adelphi Academy, Brooklyn, N. Y.

Chas. E. Adams, M.A., Waterville, Me.

Miss Mary E. Allen, Ladies' Gymnasium, Boston, Mass.

Harlan P. Amen, M.A., Riverview Academy, Poughkeepsie, N. Y.

Rev. Edward Anderson, Norwalk, Conn.

H. Anderson, Garden City School, L. I.

William G. Anderson, M.D., Adelphi Academy, Brooklyn, N. Y.

Miss Kate S. Anderson, Norwalk, Conn.

Alfred J. Andrews, Barnard's School N. Y City.

J. Douglas Andrews, Y. M. C. A. Gym., Brooklyn.

Wm. Holston Andrews, 132 S. Oxford St., Brooklyn.

A. Austin.

Miss Sallie N. Ayres, 155 DeKalb Ave., Brooklyn, N. Y.

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Truman J. Backus, LL.D., Principal Packer Institute, Brooklyn, N. Y.

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L. K. Baker, Western Reserve University, Cleveland, O.

Miss L. A. Bangs, Packer Institute, Brooklyn, N. Y.

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Miss Ida Daudridge Bennett, Akeley Institute, Grand Haven, Mich.

Miss S. H. Betts, Norwalk, Conn.

W. J. Betts, A.M., Betts' Academy, Stamford, Conn.

Prof. Carl Betz, 3032 12th St., Kansas City, Mo.

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Miss Anna J. Bridgeman, Rockford, Ill.

Miss C. Evelyn Brown, 440 Franklin St., Brooklyn, N. Y.

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G. C. Butterfield, Y. M. C. A., Marquette, Mich.

Miss M. A. Butts, New York City.

Miss Marion Carter, 400 State St., Brooklyn, N. Y.

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G. H. Church, Sing Sing, N. Y.

B. Clark, M. D.

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R. A. Clark, 138 E. 31st St., New York City.

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Blanche A. Cornwell.

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Philo P. Haven, Y. M. C. A., Bridgeport, Conn.
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William Hessler, Hoboken, N. J.
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H. M. Howland, Y. M. C. A., Philadelphia, Pa.
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William A. Jackson, Y. M. C. A., Washington, D. C.
Prof. Alex Johnston, Princeton College, Princeton, N. J.
Miss Georgia Jones. 46 4th Ave., Brooklyn, N. Y.
Miss Minnie A. Jones, 288 Jefferson Ave.. Brooklyn, N. Y.
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Miss Kincaid, Jamestown, N. Y.
L. Kirsinger, Patterson, N. J.
Prof. H. J. Koehler, U. S. Military Academy, West Point, N. Y.
Miss C. C. Ladd, Byrn Mawr Col. Pa.
Miss Langfear.
George A. Leland. M.D., Boston.
F. E. Leonard, Director College Gymnasium, Oberlin, O.
Miss E Marguerite Lindley, Ladies' Gymnasium, Atlanta, Ga.
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W. H. Martin, Brockton, Mass.
W. W. Martin, Plainfield, N. J.
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Prof. Henry Metzner, 212 E. 83d St., New York City.
Gen. E. L. Molineux, Brooklyn, N. Y.
Z. W. Monroe, Monroe, Wis.
Miss R. Anna Morris, Des Moines, Ia.
Miss Ada Moseley, 287 Clinton St., Brooklyn, N. Y.
Miss Harriet Moseley, 287 Clinton St., Brooklyn, N. Y.
Eliza M. Mosher, M.D., 129 Pierrepont St., Brooklyn, N. Y.
L. J. Muchmore, A. M., Dickinson College, Carlisle, Pa.

Boardman L. Oviatt, 158 E.86th St., Yorkville Branch Y. M. C. A.
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R. F. Nelligan.
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Thornton, Sowby, Y. M. C. A., Germantown Pa.
A. M. Starkloff, M.D, President N. A. Turnerbund, St. Louis, Mo.
William A. Stecker, St. Louis, Mo.
Fremont Swain, M. D., Y. M. C. A., Indianapolis, Ind.
Arthur M. Taft, 134 St. James Pl., Brooklyn, N. Y.
Edith Taft, 134 St. James Pl., Brooklyn, N. Y.
Elizabeth Taft, 134 St. James Pl, Brooklyn, N. Y.
Enos N. Taft, 134 St. James Pl., Brooklyn, N. Y.
Julia M. Taft, 134 St. James Pl., Brooklyn, N. Y.
Martha Taft, 134 St. James Pl, Brooklyn, N. Y.
Theodore M. Taft, 134 St. James Pl., Brooklyn, N. Y.
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Henry Tuder, Chicago, Ill.
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John D. White, L. L. D., Berkeley School 44th St., N. Y. City.
Frank N. Whittier, A.B., Bowdoin College, Brunswick, Me.
C. W. Williams, Y. M. C. A. Gymnasium, St. Louis, Mo.
Charles Williamson, Quincy, Ill.
F. D. Wood, M.D., College P. & S., New York City.
Miss Fanny F. Wright, Walnut Hill, Cincinnati, O.

CONSTITUTION.

Article I.—Name.

This body shall be called the "American Association for the Advancement of Physical Education."

Article II.—Objects.

The objects of the Association shall be to disseminate knowledge concerning physical education, to improve the methods, and by meetings of the members to bring those interested in the subject into closer relation to each other.

Article III.—Membership.

Sec. 1.—The Membership shall consist of Active, Associate and Honorary members.

Sec. 2.—Active membership shall be restricted to those directly engaged in Physical Education.

Sec. 3.—Associate Members shall include all who are interested in the cause of Physical Education, and desire to be associated with the Society.

Sec. 4.—Honorary Members shall not exceed the proportion of one to twenty-five Active Members, and shall consist of persons well known as patrons of Physical Education. They shall be nominated by the Council and require a two-thirds vote of the members present to elect.

Sec. 5.—Active and Associate Members shall pay the same dues and be entitled to the same privileges, except that the President, Secretary, and at least three other members of the Council shall be chosen from the Active Members.

Sec. 6.—Active and Associate Members shall be proposed in open meeting of the Society, and be elected by a two-thirds vote of the members present. The Council shall determine to which class each member belongs.

Article IV.—Officers.

The Officers of this Association shall consist of a President, three Vice-Presidents, a Secretary, a Treasurer, who, with three additional members, constitute the Council.

Article V.—Meetings.

The Meetings shall be held on the day following the National Thanksgiving. The Council, however, can change the time or call Special Meetings.

Article VI.—Revenue.

Sec. 1.—One dollar shall be due at the Annual Meeting from each Active and Associate Member.

Sec. 2.—Any member neglecting to pay his annual dues for two successive years shall forfeit his membership.

Article VII.—Quorum.

Fifteen members shall constitute a quorum to do business.

Article VIII.—Amendments.

All alterations or amendments to the Constitution must be presented in writing, lie over for one meeting, be advertised in the notice of that meeting, then adopted by a two-thirds vote of the members present.

BY-LAWS.

1.—The President shall preside at the meetings of the Association and Council, and deliver an address at the Annual Meeting.

2.—In the absence of the President the Senior Vice-President shall preside.

3.—The Secretary shall perform the duties usual to his office. His traveling expenses to and from the place of Annual meeting shall be defrayed by the Society.

4.—The Treasurer, as custodian of the Association funds, shall not pay out any money except on vote of Council, certified to by the Secretary and endorsed by the presiding officer. He shall render a report at the Annual Meeting, when the books shall be audited by a special committee.

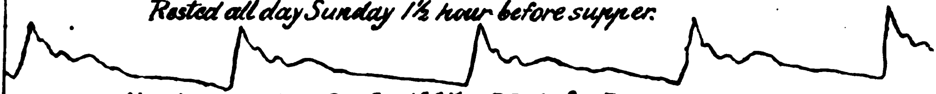
5.—The Council shall exercise a general oversight over the affairs of the Association; arrange programme for the meetings, and control the expenditures of the Association. They shall make rules for their own government.

6.—All papers read before the Association shall be the property of the author of the paper, to be published where he chooses, but he shall give the Council the privilege of publishing it in the Transactions of the Society if they so desire.

7.—Amendments to the By-Laws shall receive the unanimous consent of the members present, or take the same course as amendments to the Constitution.

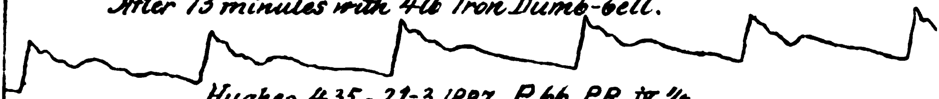
IRON DUMB BELL.

Rested all day Sunday 1½ hour before supper.



Hughes. 4.30 P.M. 21-3-1887. P.R. IV 3/4 P.

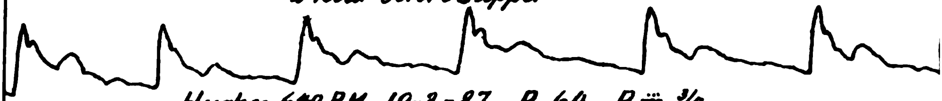
After 13 minutes with 4 lb Iron Dumb-bell.



Hughes 4.35 - 21-3 1887 P. 66. P.R. IV 1/4.

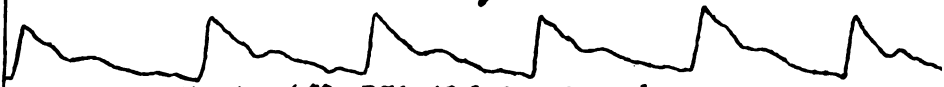
HORIZONTAL BAR.

½ hour before supper



Hughes $6^{\underline{40}}$ P.M. 19-3-87. P. 64. P III 3/4.

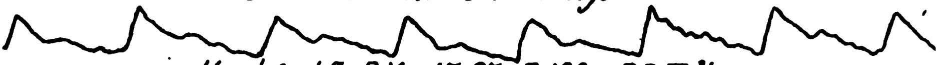
After 15 minutes on Horizontal Bar.



Hughes $6^{\underline{55}}$ P76 19-3-87 P.R. III 3/4

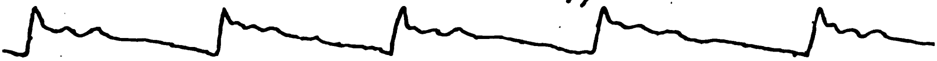
RINGS (PARALLEL)

After 15 minutes on Rings.



Hughes '5 P.M. 17 87 P. 100. P.R. III 3/4.

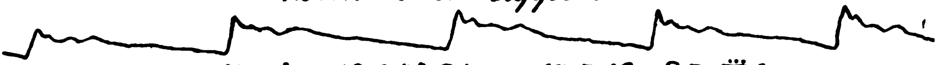
1½ hour before supper.



Hughes: 19. $5^{\underline{20}}$ P.M. 17-87 P. 61. P.R. III 3/4.

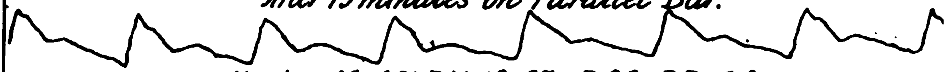
PARALLEL BAR.

1/2 hour before supper.



Hughes 19. $5^{\underline{45}}$ P.M. 18-87 P. 62. P.R. III 3/4

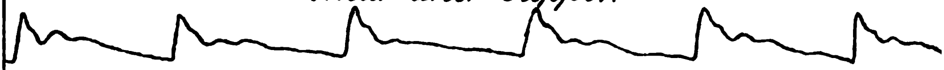
After 15 minutes on Parallel Bar.



Hughes 19. $6^{\underline{01}}$ P.M 18-87. P. 89. P.R. III 3/4.

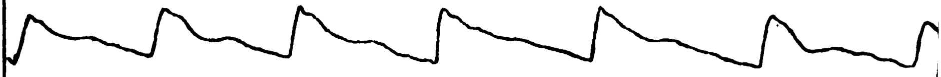
CHEST MACHINES.

1/2 hour after supper.



Sullivan 21 P. P.R. III 1/4.

After 15 minutes with chest machine
Double motions 600 times each weight 11 lbs.



Sullivan 21.- $5^{\underline{40}}$ .P. 80 P.R. III 1/4.

PLATE IV.

OBSERVATIONS, TAKEN WITHOUT THORACTIC OBSTRUCTION.

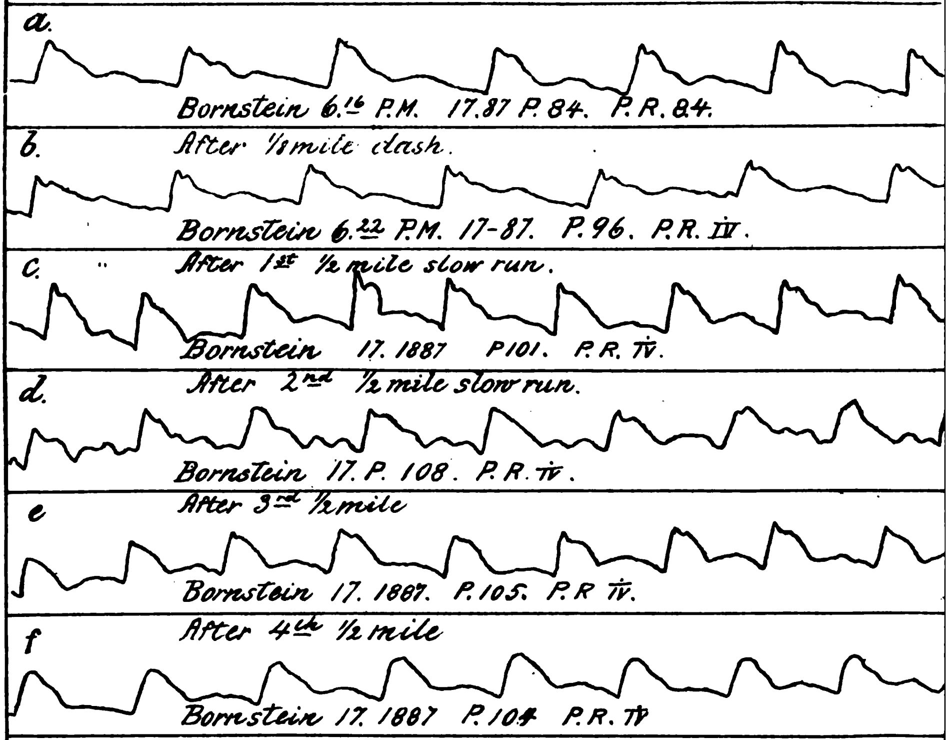


PLATE V.

OBSERVATIONS, TAKEN WITH THORACTIC CONSTRICTION.

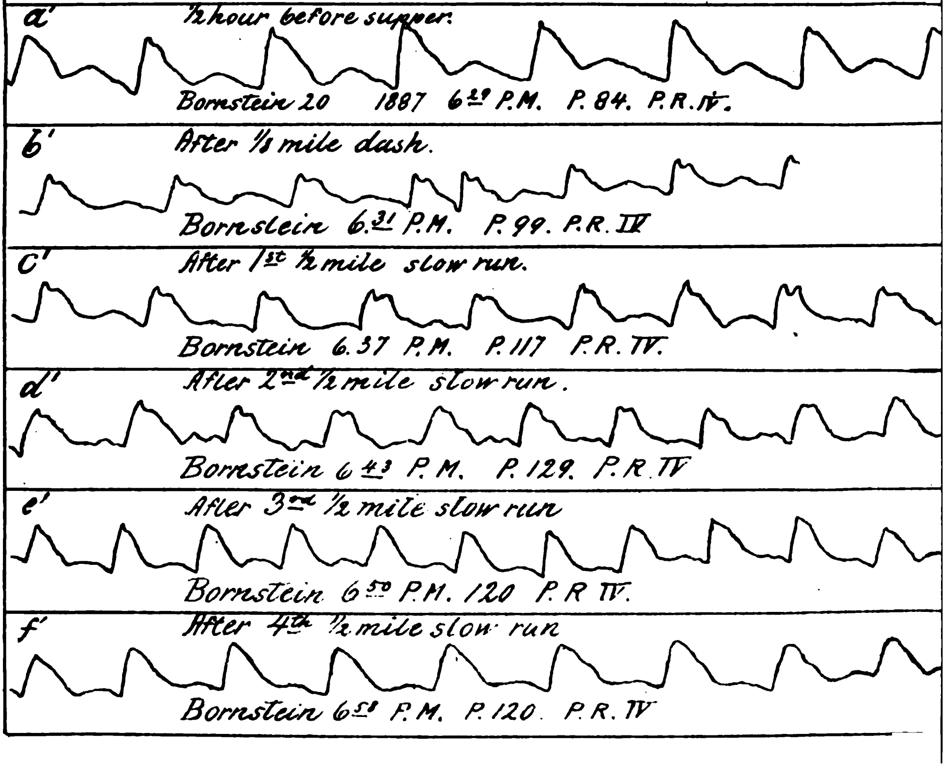
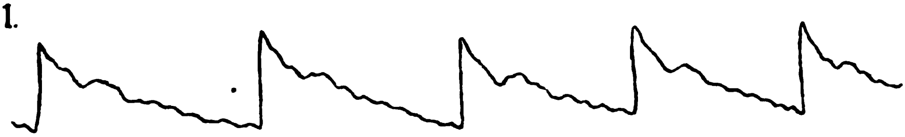


PLATE VI

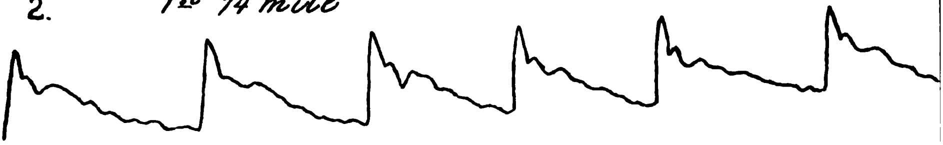
2 MILE RUN BEFORE SUPPER.

1.



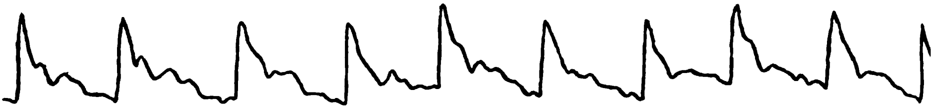
104-3-27-1888-4^{00} P.M. P.3

2. 1st ¼ mile



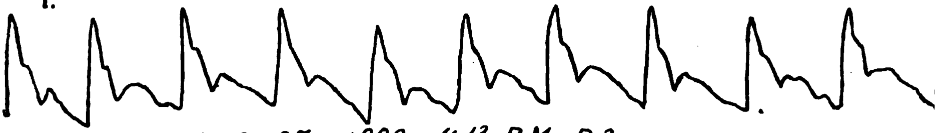
104-3-27-1888-4^{05} P.M. P3

3 2nd ¼ mile



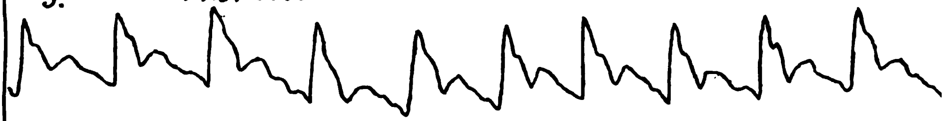
104-3-27-1888-4^{08} P.M. P.3

4. 1st mile



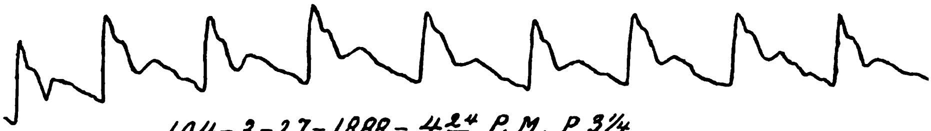
104-3-27-1888-4^{13} P.M. P.3.

5. 1½ mile



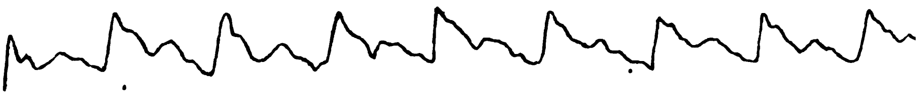
104-3-27-1888-4^{19} P.M. P.3

6. 2nd mile



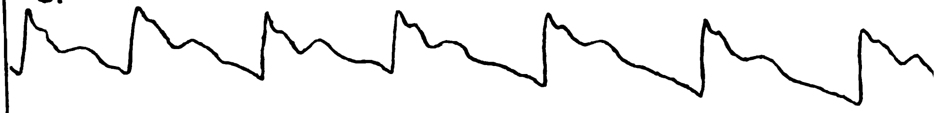
104-3-27-1888-4^{24} P.M. P 3¼

7. Bath and Dress.



104-3-27-1888-4^{44} P.M. P.2¼

8. 20 minutes rest

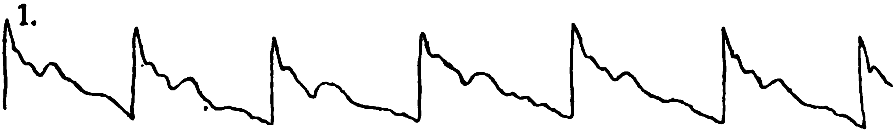


104-3-27-1888-5^{17} P.M. P3½.

PLATE VII.

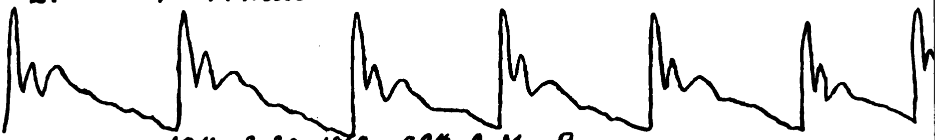
2 MILE RUN AFTER BREAKFAST.

1.



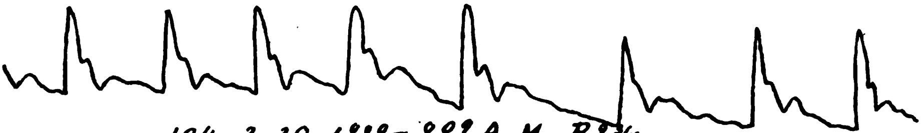
104-3-30 1888-8^{00} A.M. P 2½

2. 1st ¼ mile



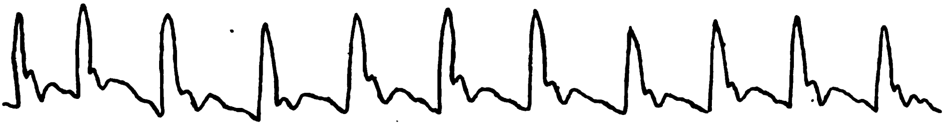
104-3-30-1888-8^{04} A.M. P

3. 1st ½ mile



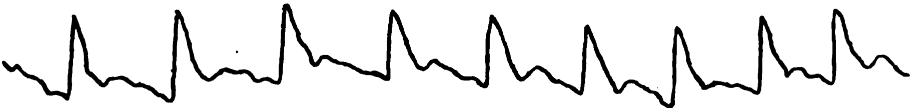
104-3-30-1888-8^{09} A.M. P. 2¾.

4. 1st mile.



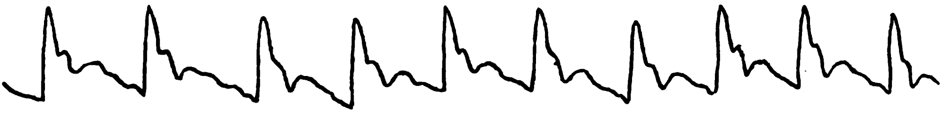
104-3-30-1888-8^{14} A.M. P. 2¾.

5. 1½ mile



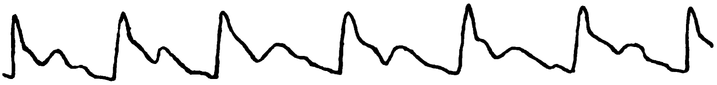
104-3-30-1888-8^{19½} A M. P2¼

6. 2nd mile.



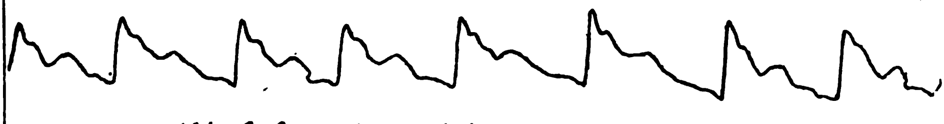
104-3-30-1888-8^{24} A.M. P2¾.

7. Bath and Dress.



104-3-30-1888-8^{40} A.M. P2¾.

8 20 minutes rest.

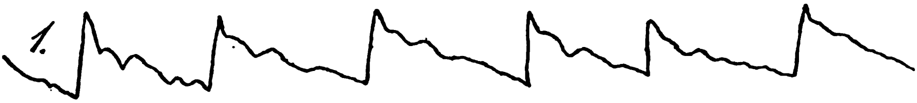


104-3-30-1888-9^{00} A.M. P. 2½.

PLATE VIII

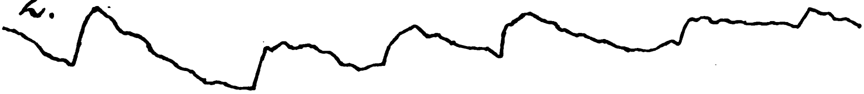
CASE I.

1.



32-S.-10-10-1888- 3^{15} P. M. P. 3¼

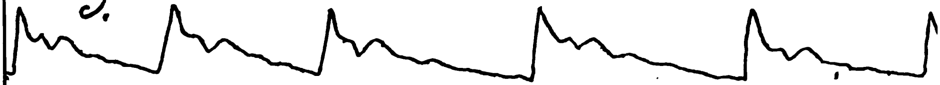
2.



32-S-10-10-1888- 3^{20} P.M. P. 3¼.

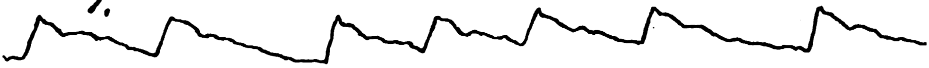
CASE II.

3.



14.-M- 10-7-1888- 4^{20} P.M P. 3¼.

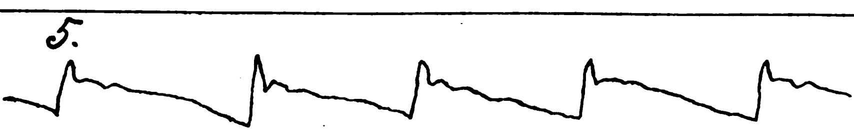
4.



14-M-10-7-1888- 4^{25} P.M. P3¼

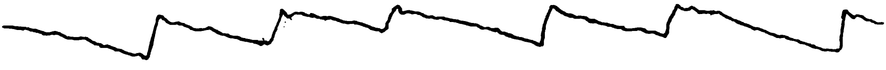
CASE III.

5.



19.-R.-10-15-1888- 5^{50} P.M. P. 2.

6.



19-R- 10-15-1888- 5^{55} P.M. P. 2.

VI . 5949

PROCEEDINGS

OF THE

AMERICAN ASSOCIATION

FOR THE ADVANCEMENT OF

PHYSICAL EDUCATION,

AT ITS

FIFTH ANNUAL MEETING

HELD AT

CAMBRIDGE AND BOSTON, MASS.,

APRIL 4 AND 5, 1890.

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ANDRUS & CHURCH.
1890.

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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF PHYSICAL EDUCATION.

REPORT OF THE FIFTH ANNUAL MEETING.

The annual business meeting of the Association was called to order at the Hemenway Gymnasium, Cambridge, Mass., at 12. M., April 4th, 1890, by President Blaikie, who addressed a few congratulatory words upon the flourishing condition of the Association.

The report of the Treasurer, Dr. Anderson, was read, accepted, and ordered on file with the Secretary.

The report of the Secretary, Dr. Seaver, was read and accepted.

The new members, whose names appear enrolled in this report, were then elected.

Following is the list of officers as elected for the ensuing year:

President	D. A. Sargent, M.D.
Vice Presidents	J. Gardner Smith, M.D. Carolyn C. Ladd, M.D. E. M. Hartwell, M.D.
Secretary	E. Hitchcock, Jr., M.D.
Treasurer	W. G. Anderson, M.D.
Council with above	William Blaikie, Esq. W. S. Hall, M.D. Luther Gulick, M.D.

Association adjourned to meet in Huntington Hall, Boston, at 3 P. M., and being then and there assembled, with President Sargent in the chair, the following programme was carried out:

1. Paper by E. M. Hartwell, M.D. "The Work of Physical Education in the Elmira Reformatory."
2. By E. Hitchcock, Jr., M.D. Presentation to the Association of a chart of 15,000 examinations of college students, arranged by averages.
3. Paper by E. Hitchcock, M.D. "Anthropometry."
4. Discussion, led by W. S. Hall, M.D.

5. Paper by Miss Mary E. Allen. "Physical Development of Women,"

6. Discussion, led by Lena V. Ingraham, M.D.

7. Paper by C. J. Enebuske, Ph.D. "Gymnastic Progression."

Adjourned to 8 P. M.

8. Paper by D. A. Sargent, M.D. "Physical Tests of a Man," illustrated by the stereopticon.

9. Discussion by members.

Adjourned to April 5th, 9.30 A. M.

10. Paper by Karl Zapp. "Physical Education in the Public Schools of Cleveland, Ohio."

11. Paper by Luther Gulick, M.D. "A New Profession."

12. Discussion, led by E. O. Otis, M.D.

13. Paper by Miss L. E. Hill. "Some Notes on Gymnastic Work with Women."

14. Discussion, led by Carolyn C. Ladd, M.D.

15. Paper by E. H. Bradford, M.D. "The Treatment of Lateral Curvatures."

16. Discussion, led by C. L. Scudder, M.D.

17. Paper by Walter Channing, M.D. "The Influence of Physical Exercise on the Nervous System."

18. Discussion, led by Edward Cowles, M.D.

At the conclusion of his paper, Dr. Gulick moved "that a committee of five be appointed by the chair to present to the Society a report on the following subjects:

1. To suggest a list of valuable books and articles on Physical Education.

2. To suggest a list of studies for this profession corresponding to the seven studies of the medical school.

3. To suggest a degree which, in our estimation, is a suitable one for this profession." Carried.

Association adjourned, after accepting an invitation to attend a gymnastic exhibition to be given in Mechanics' Hall, on the same afternoon, by six hundred pupils of the schools in and about Boston and by pupils of private gymnasia.

E. HITCHCOCK, JR., Sec'y.

Owing to Dr. Hartwell's absence from the country, the Secretary has been unable to obtain his paper for publication. The papers by Miss Hill and Dr. Channing have been witheld from publication by the writers.

A SYNOPTIC EXHIBIT OF 15,000 PHYSICAL EXAMINATIONS.

BY E. HITCHCOCK, JR., M.D.

Dr. E. Hitchcock, Jr., presented to the Association the averages obtained from the physical examinations of nearly fifteen thousand recorded examinations of students of Yale University, Amherst College, and Cornell University, as tabulated by him during the past year, These averages were exhibited in graphic form, and the compiler suggested a method of using the figures for the giving individuals examined a basis for comparison between their own measures and the averages.

Following is the list of averages as presented :

Weight,	135.2
HEIGHT.	
Stature,	1.722
Sternum,	1.406
Navel,	1.030
Pubis,	.859
Knee,	.424
Sitting,	.904
GIRTH.	
Head,	.570
Neck,	.349
Chest, Nat'l,	.877
Chest, Exp'd,	.924
Belly,	.726
Hips,	.892
Right Thigh,	.515
" Knee,	.359
" Calf,	.354
" Instep,	.242
Left Thigh,	.511
" Knee,	.357
" Calf,	.348
" Instep,	.240
Biceps,	.294
Right Up. Arm,	.258
" Elbow,	.251
" Forearm,	.264
" Wrist,	.165
Left Up. Arm,	.251
" Elbow,	.246
" Forearm,	.258
" Wrist,	.164
BREADTH,	
Head,	.154
Neck,	.107
Bi-deltoidal,	.430
Chest,	
Nipples,	.197
Waist,	.252
Hips,	.323
LENGTH.	
Right Sh'ld'r Elb.,	.373
" Elb. Tip,	.461
Left Sh'ld'r Elb.,	.371
" Elb. Tip,	.457
Right Foot,	.258
Left Foot,	.258
Stretch Arms,	1.782
Hor. Length,	1.735
Cap'y of Lungs,	3.88
STRENGTH.	
Back,	136.7
Legs,	167.6
Chest, { Dip,	5.9
Chest, { Pull up,	8.8
Forearm,	39.5

ANTHROPOMETRY.

BY E. HITCHCOCK, M. D.

Dr. E. Hitchcock, of Amherst College, offered to the Association a revised table of Anthropometry, with these preliminary words:

"For several years past I have felt that stature, or bodily height, was a much more reliable standard for work in Anthropometry than that of age, weight, or any other criterion. Hence, in 1888, from data gathered at Amherst College, I constructed some tables bearing on this point for our immediate use and instruction, which were neither copyrighted, advertised, nor offered for sale, though freely given to anyone who asked for copies.

"And while these tables were not a little imperfect, yet as the idea of stature was plainly clear in 37 out of the 42 items observed, it seemed encouraging to try again in 1889 and with three years more of data to issue another edition. This was done with corrections of a few of the errors in the early edition, and the final result seemed to point still more clearly to the existence of the law.

"In the winter of 1890 a friend placed such money at my disposal that I was enabled to go over the whole of our anthropometric statistics with sufficient clerical assistance, and in a little different form bring out the third edition of the Anthropometric Tables which are on the platform before you, and which I beg the members of the Association to accept for themselves and send for more if these are not sufficient.

"No description is offered of them further than to say that they are prepared as exactly as possible from the directions recommended for procuring anthropometric data by this Association in 1886."

The Table following exhibits, under fifty-five items, the average measurements of bodily proportions and tests of strength which were obtained during the college years 1861–2 to 1888–9, from the study of nearly eight thousand Amherst College students, seventeen to twenty-six years of age.

The Table is so arranged that it may be used to record the measurements of any young man, affording him a ready comparison of himself with the normal or average young man as represented by the printed columes of figures. The items of the Table are arranged in two parallel central columns, representing the same value, but one in the metric and the other in the English system; and blank spaces are left on each side for individual records.

To record the results of an examination: if the item is less than the standard as represented in these central columns, put it in the left blank space; if the same or greater, put it in the right. In this way, when the examination is fully recorded, the person can ascertain at a glance, by simple addition or subtraction, how much he varies from the measurements of a young man of 1725 millimetres or 67.9 inches stature, which is regarded as the standard for the students of Amherst College. Should he desire to know the percentage of difference between himself and the standard, a simple division will inform him, and its result, whether less or greater, can be recorded on the outer blank space.

AVERAGE ANTHROPOMETRIC TABLE.

1725 millimeters, or 67.9 inches being the standard.

	Items.	Per Cent.	Below Average.	Metric System.	English System.	At or above Average.	Per Cent.
	Weight,			61.2	134.6		
				Kilos.	Pounds.		
				M. M.	Inches.		
	Stature,			1725	67.9		
Heights.	Sternum,			1410	55.5		
	Navel,			1030	40.6		
	Pubes,			860	33.9		
	Sitting,			903	35.5		
	Knee,			476	18.7		
Girths.	Head,			572	22.5		
	Neck,			349	13.8		
	Chest, repose,			880	34.6		
	Chest, full,			927	36.5		
	Belly,			724	28.4		
	Hips,			893	35.1		
	Right Thigh,			517	20.3		
	Left Thigh,			512	20.2		
	Right Knee,			361	14.3		
	Left Knee,			359	14.2		
	Right Calf,			359	14.2		
	Left Calf,			349	13.8		
	Right Instep,			245	9.5		
	Left Instep,			242	9.4		
	R. U. Arm,			257	10.0		
	L. U. Arm,			253	9.9		
	R.U.A., cont.,			295	11.6		
	R't Elbow,			251	9.8		
	Left Elbow,			247	9.7		
	R't Forearm,			267	10.5		
	L'ft Forearm,			261	10.2		
	Right Wrist,			166	6.5		
	Left Wrist,			165	6.5		

AVERAGE ANTHROPOMETRIC TABLE.

1725 millimeters, or 67.9 inches being the standard.

	Items.	Per Cent.	Below Average.	Metric System.	English System.	At or above Average.	Per Cent.
				Kilos.	Pounds.		
	Weight,			61.2	134.6		
				M. M.	Inches.		
	Stature,			1725	67.9		
Breadths.	Head,			155	6.1		
	Neck,			108	4.2		
	Shoulders,			430	16.9		
	Nipples,			198	7.8		
	Waist,			250	9.8		
	Hips,			323	12.7		
D'th.	Chest,						
	Abdomen,						
Lengths.	R. Sh. Elb.,			373	14.7		
	L. Sh. Elb.,			371	14.6		
	R. Elb. Tip,			461	18.1		
	L. Elb. Tip,			459	18.0		
	Right Foot,			260	10.2		
	Left Foot,			259	10.2		
	Stretch Arms,			1780	70.1		
	Hor. Length,			1732	68.1		
				Kilos.	Pounds.		
Strengths.	Lungs,			1.5	3.30		
	Back,			137	301		
	Legs,			166	365		
	R. Forearm,			41.5	91.3		
	L. Forearm,			38.1	83.8		
				No. of times.			
	Dip,			6			
	Pull Up,			9			
				Litres.	Cub. In.		
	Lung Capacity,			3.77	230		
				Tenths of Body.			
	Pilosity,			2.25			

PHYSICAL DEVELOPMENT OF WOMEN AND CHILDREN.

BY MARY E. ALLEN.

I have selected "The Physical Development of Women and Children" for the subject of my paper, because I wish to speak to you particularly of my work with them, and not to imply that the processes for their development especially differ from those expedient for men. Early convinced in my teaching experience that methods for mental development for boys and girls applied equally, without regard to sex, I carried the same thought when I began to develop the physical, and fitted my gymnasium with the ordinary appliances used in men's gymnasiums.

The experience of twelve years has not changed my opinion in regard to the value of such appliances. Overwork in school brought upon me a state of health which forced on my attention the fact that nowhere in Boston twelve years ago could a woman or child secure any instruction in relation to physical training. More investigation showed that not only in Boston, but in every city in the Union, there was the same lack. New York had a few classes for women in men's gymnasiums, and that was about all.

Out of this strong sense of need sprang the first institution for the general training of the physique of women and children, in Boston, and the growth in interest has been slow, but steady and sure, until now the Allen gymnasium is one of the largest in the country and hundreds of women and children yearly testify to the value of the development there gained. Many physicians, finding the application of the ordinary remedies to the increasing nervous condition of women and children unsatisfactory, gladly availed themselves of this more rational and natural means of cure.

Still the growth of the work has been very slow throughout the country; and when we consider that even progressive New York has only within a year built its first gymnasium for women, and that (with a population of a million people) much smaller than the Allen gymnasium, and that no city has a gymnasium building devoted to women, outside of colleges, to our knowledge, the growth of interest cannot be considered phenomenal; nor is it in the least in proportion to the momentousness of the need.

One naturally looks about for the cause for this slow awakening. Considered thoughtfully, several reasons are patent: First, there exists an almost absolute ignorance of the make-up of the human body among intelligent people, and, more remarkable still, an apparent shrinking from such knowledge; secondly, growing out of this ignorance, the blind worship of so-called mental acquirements, ignoring the true way of reaching the best; thirdly, the want of time in which to do anything well. The excited rush and hurry of American life crowds what should take two or more days for performance into one day, so that even little children pitifully complain that they have "no time." The direct outcome from this unquiet state of things is a profound lack of steadiness of purpose in any educational direction. Then, again, we have not grasped the great thought of the inter-dependence of soul and body, which, if acknowledged, would make the body sacred; not merely the home of the soul but its complement, its co-worker and helper. There still hangs a halo about invalidism. Health has not yet become an object of worship. The effort to gain it has not been placed before the majority of people as a conscientious duty. Only when we fully accept the fact that moral and physical life are interlinked in man, shall we know that we are directly reponsible for unsoundness in the body as for evil in the soul. Thus, even those most interested are slow to recognize the fact that bodily exercise is as essential to true living, as eating, drinking or sleeping, and hence the want of persistence in regularity of exercise.

I say this blind worship of mental attainments, and blinder methods of reaching them, grow out of ignorance of this wonderful mechanism we call our body, because, as soon as we begin to study the intimate inter-dependence of an organism made up of many factors, we find that mentality is not a function of some organ independent of all others, but that it is a function of the brain, an organ of the body, as respiration is the function of the lungs, or digestion of the stomach.

Proceeding farther, we note that the perfection or imperfection of the working of each organ depends upon the perfection or imperfection of every other organ. All nourished by the same life-giving principle, if the digestive power of the stomach be disturbed, the brain faculty is impaired; if the circulation be in any way impeded, the brain immediately feels a loss. On the other hand, if the brain and nerve centres be disordered, resulting in a deficiency in quality or quantity of nerve fluid, every other organ suffers for want of its natural stimulus. The extreme delicacy of the dependence of one organ upon another is a source of constant wonder to the student, and to ascribe the criminal neglect of many of the laws governing the body, at present so prevalent, to ignorance, is surely to put it in the most lenient light.

I do not expect to tell you any new truths this afternoon, nor am I here to speak to experts, but to draw the attention of those not professionally conversant with the subject to our irrational way of living, and to the neglect of our body-training in our scheme of education. During every period of life the brain and nerve centres are the seat of increasing call to intense activity. From the time the baby is born, to say nothing of its pre-natal existence, its nervous system is vastly over-stimulated. It is not allowed to kick itself into vitality ; hampered by clothes from the very beginning, its bodily movements are cramped, and the excessive demonstrations of affection which it receives, inordinately sap its vitality. In our grown-up strength it is almost impossible to imagine how our great vigorous bodies are exhausting the springs of vitality in that baby life. Dr. George Taylor, of New York, is very severe in his strictures upon our thoughtlessness in this direction, dating back to this depletion of life-force in infancy many grave cases of nervous exhaustion and even deformity. This is a point of danger seldom recognized by parents. The baby is not left, like a little animal, to creep about and find the things it wants to play with, but new toys and fresh devices for amusement are continually forced upon it, and another strain is made on the nerve-centres, while at the same time the vitiating tendency to instability of purpose in education is thus early started, the results of which are much to be deprecated. If the baby is born among those who believe in Kindergarten training, four little years bring him to the time for educating his intellect ; in almost every family at seven or eight begins the real schooling, and under what conditions !

Look at your curriculums of study ! During the last twenty years, out of the five school hours, only twenty minutes have been allowed for regular developing exercise, and not until very recently has there been any suggestion of a necessity for educating teachers to use their time to advantage in progressive movements. It is to be hoped that the present agitation of the subject will soon result in an established course of progressive exercises, in accord with the grades of the schools. Private schools ordinarily make no provision whatever for any relief from brain and nerve tension, except what a short recess will bring. Several private schools in this city have, however, roused somewhat in this matter and for the past two or three years sent several pupils to our gymnasium ; and Mrs. Hayes of Marlboro street, in this city, has this year set the example of offering in her circular the advantages of regular exercise in a gymnasium, and many of her pupils availed themselves of it. In few courses of study is there intelligent understanding of the fundamental principle of mental development through bodily development. In the city opportunities, in winter by daylight, for play are very limited even for young children and for girls of twelve and over, romping being unfortunately unpardonable, exercise is limited to walking, and the pressure of piano and other out-of-school lessons curtails even this insufficient form of exercise. Thus to a keen observer, from the cradle onward the organs vastly more stimulated and immensely overpressed are the brain and nerve centres.

It is not the higher education that hurts our girls ; it is the attempted education of one set of faculties at the expense of others, and without their help. Exercising one set of organs exclusively for any length of time determines the main part of the circulation in that direction, consequently clogging the circulation in every other direction, and the function of every other organ is performed less effectively. Work of any organ or tissue involves the production of heat ; heat implies combustion ; combustion creates waste in every tissue, as surely as the burning of wood in the fireplace forms smoke and leaves ashes. This waste maserial is not only useless to the tissue but is an absolute poison to it, if not excreted or carried from the system. Hence it is evident that the demand for nutrition and the formation of waste are constant in the body. To this condition the brain is no exception.

Pure blood, flowing freely, is the only medium of nourishment supply and elimination of waste matter. The circulatory system carries this vital fluid freely, if no extra demand in any direction is made. If this extra demand is made, the equilibrium between nourishment and waste is destroyed and the health of the body materially impaired. Thus the brain loses its proper nutrition and relief, and deterioration in the quality of its work is inevitable.

I believe we have little conception of what the human brain, in the masses, is capable, nor do I believe we ever shall know, until we make systematic body-training a fundamental feature of our system of education ; when we build the school-rooms around the gymnasium as a centre. Fair specimens of men and women do not result from this unbalanced bodily condition of childhood ; the same stimulation of brain and nerve goes on in after life and every department of life suffers. You may consider me an enthusiast, but study your bodies and you will acknowledge the truth of this.

The only natural remedy for this unbalanced state of things is to create an equilibrium of forces,—an harmonious working of all the organs of the body—a unity of body and soul. The only sound physiological way of accomplishing this is by exercise. Make exercise compulsory and as inevitable as eating and drinking, and we shall regenerate society. If the business man would shorten his business day by an hour and spend it in the gymnasium, he would take a better husband and father to his home, see more clearly in his business affairs, and deal more justly with his fellowmen. Women even more than men need the refreshment and recuperation of exercise, and would they take it, they would discharge the responsible and never-ending duties devolving upon them, with greater ease and wisdom. The whole tone of society would be elevated, and our children would be better conceived, better born and better educated. Exercise is the panacea. Get it daily in some way. For the masses in the city the gymnasium offers the surest means of recreation.

All who have interested themselves in the advancement of the science of movements, the last few years, know the change which is working out in legitimate gymnasiums. Formerly, athletes, or would-be athletes, governed the gymnasium, and this brought it into disrepute among those who believe in harmony of development. In the old gymnasium, if a man was a high jumper, he aspired to be the highest jumper ; if he could lift 1,200 lbs., he worked to lift ever a hundred more—each aiming to develop his special gift, leaving other muscles undeveloped. The director of the gymnasium was only another athlete, with, perhaps, more general acquirements. To-day we recognize the fact that the strength of the individual is as his weakest part, not his strongest—and so the gymnasium of to-day has for its aim harmonious body-building. Now-a-days, the good jumper rests his jumping muscles until he has brought his neglected muscles into equilibrium; and the director of the gymnasium, conversant with the anatomy of the body, becomes a teacher of body development, and, by equalizing the forces of the body, and sending pure blood to every organ, especially to the hungry brain, he becomes an invaluable helper in mental training as well.

A gymnasium then is simply a school for body training. Beginning its course with simple movements, with or without apparatus, the body grows in power and symmetry, and the next year harder and more complicated movements are needed—and thus each year develops a new class or grade. I draw particular attention to this point which is not generally recognized. Parents frequently wish to enter their children in a certain class because their friends are in it, not realizing it is a class to which those friends have climbed by years of developing exercise. Their bodies are no better prepared for such advanced work than their minds would be to enter an advanced class in any study with which they were unfamiliar.

I would like to give you a cursory glance at the methods I believe in for symmetrical body development, and which we follow in the Allen gymnasium with women and children.

We have three distinct departments of work: Private work, card work, and class work.

Private work meets the needs of the sick who must have the constant attendance of a teacher. The often heard remark, "I am not strong enough for gymnasium," means nothing if one is able to move about at all, because simple exercises, beginning with the toes and feet, with the patient lying down, thus removing any strain upon the spine and head, are given such patients who have not strength to stand for work, and continued until a few minutes of standing work can be borne. The results of exercise are carefully noted from day to day, and an increase in exercise made as fast as it can be borne. Such exercise should be taken daily, though perhaps not more than fifteen minutes of work will be given in the hour they remain in the gymnasium, the remainder of the time being spent in rest which is most recuperative. Thus the invalid is gently and surely led on to health, and graduates from strictly private work by slow deerees, perhaps, into a class or to what we call Card work, where the prescribed work necessary for individuals is distinctly written upon a card—the machines to be used, the size of weights, the movements, and the number of repetitions, with the proper periods of rest during the hour. Having learned how to do the work thus written, the patient or daily pupil is competent to continue the work by herself at whatever hour she shall find convenient. At the end of a month or some specified time, the card is returned, gain is noted, and a new and advanced card made out. Thus card work, like private work, is constantly progressive.

The great majority of women, at present, are willing to give for themselves or their children only two hours a week to exercise. For these, class work offers the best development and the most exhilaration. Perhaps a rapid sketch of an hour's exericise will give the best understanding of it.

Putting each pupil into an absolutely unfettered costume, we begin the hour with a series of free movements, without apparatus, which exercises certain sets of muscles from head to foot in regular succession, the object being gently to accelerate the circulation and to limber the joints. Following this will come, perhaps, an exercise on the breast-bars, upright bars about eighteen inches apart, which gives a little harder work but which concerns only localized parts of the body. By this time the muscles are sufficiently warmed to bear more strain, and a hard pull at the chest weights exercises from head to foot, though the trunk and arms get the main share. Following this, leg-development is in order, and a jump over a light rod, which is displaced if a trip occurs, with a landing upon a very soft mat, fills the demand; by this time the respiratory muscles are ready for enforced work, and a set of deep breathing exercises, gently and gradually increased in force, oxygenizes most fully the blood as it flows to the lungs, strengthens them and furnishes strong action to various respiratory muscles, as the diaphragm, intercostal and abdominal muscles, with stimulation to the organs situated in juxtaposition, as the stomach, liver, etc. These breathing movements, of which I make large use, they being a prominent feature of our work, are taken by the class lying down, and thus relief is afforded to the spine and brain. In addition, various other exercises are given in the recumbent position, to strengthen the back and lateral muscles. Now a wooden dumb-bell drill gives stronger all-over work than the free movements, and a run up the ladders and round the running track, again carries the work into the leg muscles, while the thorax receives its share of gain .in increased respiration. Indeed, some authors ascribe stronger development to the thorax by leg exercise than by those of the arms. A complete rest is now in order, and the whole class, donning their wraps to prevent any liability to chill, stretch for a few minutes upon the mats. The attraction of the vaulting bar is next presented, where the exercise gives courage, elasticity and agility. Then, perhaps, an iron dumb-bell drill, adding still stronger all-over training than the wooden bell drill, is succeeded by a brisk, lively competitive game of bean-bags, which induces profuse prespiration, after which the class is drawn into marching order and instruction in carriage and gait is given by a series of marching, hopping and skipping movements, and the class is dismissed, exhilarated, buoyant and hot, to its refreshing bath and fresh clothes.

Thus, you notice, that no one set of movements is continued for longer than six or eight minutes. So the mind is kept healthily occupied by diversity of work and a large number of muscles are gently exercised, insuring symmetry of development, and much more exercise is accomplished than by the use of harder movements on a few machines. In class work every exercise possible is performed to the accompaniment of music, in which I most heartily believe.

As the years increase the body demands harder work, and exercises above the floor on high parallel bars, where the weight is held by hands over the head ; low parallels where the weight is suspended or held by the shoulders ; traveling rings where the weight is held by one hand ; climbing and shinning exercises, are added according to development. Thus have many fallacies concerning what women can do and what they cannot do, been exploded and we hope the time is near at hand when well women will be the criterion for judging ability, and not sick women.

I have tried to give you a little idea of our method of developing the body systematically and safely. You will have noticed that I use heavy apparatus as well as light. Only by its use, and especially by such as carries the body above the floor, can we bring out and educate many qualities otherwise left dormant, especially in women. The use of ladders, high bars, etc., gives courage, self-reliance, clear-headedness, power of quick decision and alertness ; the opportunity to overcome a tendency to dizziness and to fear at trifles, so often affected by women. The ability to run up and down ladders ; to hang by a rope ; to slide down a pole ; to jump from a height and land properly, is no slight addition to the education of a woman in these days of ocean travel and mountain climbing. I have little doubt that Secretary Tracy's daughter and granddaughter, in the recent sad accident in Washington, would have reached the ground in much better condition had they known how to let themselves down from a height instead of jumping and to land on the ball of the foot, with bent knee, to save the jar to the spine. I also believe that gymnasium work will receive a large addition to its value when it gives its legitimate place to equilibrium, stretching and relaxation work, notably represented in this city by Dr. Emerson in the Emerson School of Oratory and by Miss Annie P. Call. I regret exceedingly that no representative of this work will be given in our illustrations exercise tomorrow.

Thus it will be seen that gymnastic work can be made to meet the needs of all. Well women should go to gymnasiums to put all their forces into equilibrium and deposit a surplus in the bank, so to speak, against future need. One of my pupils, the wife of a prominent citizen of Boston, who has been with us several years, said the doctors were surprised at her rapid recovery recently from from a dangerous attack of pneumonia following the influenza, and she assured them that her work at the gymnasium had given her the recuperative force. The sick woman should go to gain health. The depressed, overworked woman, should go for the cheer and recreation exercise will give. The woman, overweighted with flesh, should go to turn her flesh into available muscle and if it is unnatural, to reduce it. If, for instance, the calf of the leg is flabby, it is carried round as a burden ; turn the flesh into muscle and it will carry us instead. The thin woman should go to stimulate her circulation and create a healthful appetite for healthful food. The young mother should go to make her body the sound and holy temple it should be for the young life she brings into the world. The older mother should go to keep herself young for her grown-up boys and girls and well-poised to meet wisely their increasing demands, mental and spiritual. For all young women the gymnasium offers not only increased health and vigor, the grand desideratum, but such exercises as will round and make supple her whole figure. To secure a finely moulded arm, and head well-poised on comely shoulders, with grace of bearing, should be an added motive. 'Tis a mistaken idea that gymnastic exercises give ugly and knotted muscles. Properly applied, they simply mould and make beautiful.

All children should begin developing gymnastics when they begin school. Education, in the fullest sense, should mean both physical and mental training ; because the latter is absolutely dependent on the former.

I have spoken of the development of the body by the use of safe and progressive exercises and appliances, and here I think it only just to correct a very mistaken impression which exists in the community, that the movements of the Swedish system are more slowly and safely progressive than are those we use in this country. The exact contrary is true, if we may judge by the work shown by the Boston School of Gymnastics on this stage last November. My criticism when we left the hall was : "But it is all advanced work. If it is for schools, elementary work should have been shown." What, then, was my surprise to hear it announced, at the close of the last session, that these exercises were already used in the schools for the first year's work. Some of the hardest complex movements were shown, when, in my opinion, nothing harder than simple movements are advisabie the first year, and some of the exercises would have no place in the Allen gymnasium before the end of the second year. The Swedish movements are much less finely graded than the American. Whether this is in favor of the American work would depend upon whether one desired push and hurry in body development as in the method now in vogue in mental education, or preferred slower but safer methods.

Since the Swedish system has been much before the public the last two years, and since a discussion is to follow this paper, I would like, before I close, to call your attention to several points of radical difference aimed at by the two methods of work, the Swedish and American, in the hope that some adherents of the former will make clear their position. The Swedish system, as taught in this city, requires concentration of mental effort. The American work aims at recreation and relief from mental effort. Everyone who watched the beautifully precise exercises exhibited here in November must have been impressed with the intense attention required of every pupil to follow orders. This may accord with Swedish needs. Does it with American? With brain and nerve centres already too much taxed, surely exercise, as I have here shown, should be so arranged as to relieve and to give as much fun as possible. To this end, a leader is always before my classes, that memory may not be taxed and that the medium of instruction shall be the eye, thus carrying the demand to another set of nerves and relieving those of the ear, which in school have been in use for five hours. To add still more to this re-creative quality which is perfectly consistent with well-executed movements, we make a large use of music, which is rejected by the Swedish system. The delight of moving to music is instinctive in all natures from the savage to the most cultured. It exhilarates, in harmonizes, it aids precision, it saves weariness; in my experience, its effect is beneficent in every way. Nor do I agree with one of the instructors in the Swedish work that rhythmical movements are not gymnastics. If I wish a class to take repeated gymnastics, it is much more delightful to mark the repetition by a beat of music than by any other means. One of the attractions of the Swedish work, as here taught, is that no special costume is needed and no succeeding bath, because no perspiration is induced! It was said, in my presence, by the same instructor, a year ago: Not one of his pupils could say she ever perspired in exercise!

I have called your attention to the imperative necessity of excreting poisonous waste from the system as soon as possible. The skin is one of the four excretory organs, and the one that does its work least effectively. When it fails to perform its due share, too much work is thrown upon the other organs, and the elimination of poisonous matter is imperfect. Combustion is much more rapid during exercise and perspiration is the medium for skin excretion. The two million and a half sweat glands lying in the dermis or true skin, lose their power if not stimulated, like all other organs. The two million and a half mouths to the sweat ducts on the epidermis, which we call pores, become clogged by particles from the atmosphere and the clothing, and only perspiration will cleanse them truly. We are not clean enough. We therefore work to induce perspiration, bathe to cleanse, and change our costumes for fresh ones. If no perspiration is induced, the costume need not be changed for cleanliness or safety, but we consider the unfettered, free costume a large help in itself. Every one knows that no exercise is perfect that is restricted, and the dress of the ordinary woman of to-day is far too tight even for exercise in it to be safe. When Dr. Wm. P. Wesselhœft, my first strong friend and helper, first saw my girls in their newly-devised costume, twelve years ago, he said, " If you will put that dress on those girls and let them play here an hour, and nothing more, you will do them an incalculable good. " Nor was he mistaken. Besides, I consider every hour spent in unrestricted costume a sure blow dealt at the health-ruining, beauty-destroying corset.

Without perspiration, the bath is not necessary for cleanliness, but it has other uses. It acts as an invigorator and tonic to the skin, giving it the power of repelling chills and subsequent colds and attendant ills. The verdict of my patrons on this point is clear and strong. How can that be a perfect system of exercise which adds concentration to concentration, and which discards results so invaluable as those of perspiration, freedom of dress and the bath ?

I hope it will be clearly understood that I have mentioned these points of difference between Swedish and American work, not because I am, in the least, inimical to the Swedish or any other school. There are many to be suited and all have their good points, though I suppose I may be pardoned, since, like Dr. Anderson, I am a "true American," if my sympathies naturally favor our American plan of work.

I think I have shown you we have our own way of accomplishing valuable results ; yet Drs. Hartwell and Hitchcock and others say we have no American system of gymnastics. What have we ? If to have a system, we must take the theory of one man, however talented, worked out into a set form of exercise, with a peculiar and limited supply of apparatus, with no chance for indefinite growth, then are we better without a system.

If we embody in our plan the best thought, principles, movements and appliances of the Swedish, German, French or any other school, eradicate those we have found pernicious, add new devices and forms of work to meet individual needs, catch a thought from the stage, the playground, the dancing-floor, for ease and grace of movement, keep ourselves ever subject to physiological and hygienic laws—if we do all this and do not make a system, let us pray that we may not crystalize into a system, which, like a creed, seems to close the doors on growth ; but, holding the word gymnastics to its highest meaning, and living open-eared to the ever-advancing tread of scientific investigation, gathering into our plan all new truths, let us call the structure we rear, ever growing, never finished, simply and proudly, American Gymnastics.

THE GYMNASTIC PROGRESSION OF THE LING SYSTEM.

BY C. J. ENEBUSKE.

MR. CHAIRMAN, LADIES AND GENTLEMEN :

In response to a request from the Secretary of the American Association for the Advancement of Physical Education to prepare for this fifth annual meeting a paper on the Theory of the Swedish gymnastics, I have the honor to present the following outlines of this theory.

The Swedish Gymnastics is a product of the renaissance of the gymnastics in the beginning of this century. It is the natural outcome of eighty years of development, the fruit of nearly a century of careful, continuous study. It is based upon the teachings of experience and is backed by well-grounded coöperative principles of Hygiene and Education. It had its first formal introduction in 1813 in a State institution at Stockholm, and its growth has been under the protection of the Swedish government. It has been strengthened by the coöperation of all the various departments of instruction throughout Sweden, where it is now incorporated as a regular branch of educational methods. Its gradual advance has met with various demands so that the present system has been reached along different lines which bear a distinct relation to each other intrinsically and historically.

The demand for a form of gymnastics arranged to meet an essential and general educational purpose and adaptable to existing educational institutions, has produced a method that forms the fundamental department of the gymnastics in our systematization of the subject. We call it the Pedagogical or Educational Gymnastics.

From the endeavor to extend the benefit that may be derived from a rational physical training to those who are below a certain average standard of health, has grown up a special branch of gymnastics called Medical Gymnastics. This discusses the modification of method necessary to be followed in training before the average health is reëstablished. This branch, although of more recent date, and an offspring of the educational gymnastics, has developed independently and reached a stage far beyond the expectation at its birth. Its present appearance suggests a future when it will be incorporated as an essential and indispensable branch of medical science, and through the orthopedic surgeons, the neurologists, and the gynecologists, it has already been introduced in medical practice. In its development it has created an impetus to a more scientific study of the mechanism and the effect of physical movements and the results gained have reacted beneficially upon the development of educational gymnastics and have contributed essentially to bring this branch up to its present scientific standard.

From a gymnastic point of view, medical gymnastics may be considered as preparatory to educational gymnastics. It leads up to it, just as the mildest form of educational gymnastics is preparatory to its more advanced stages and leads up to them.

On the other hand the desire to meet the demand for a more specific or higher physical accomplishment has led to the development of methods for more advanced work than that belonging to educational gymnastics proper. It has resulted in the branches of Military Gymnastics, Aesthetical Gymnastics and the various forms of Applied Gymnastics.

All the other branches being either in a measure preparatory to, or more advanced growths from, educational gymnastics proper, I think it best suited to the purpose of this occasion to outline more completely the theory of the educational branch of Swedish gymnastics, and to let a mere suggestion of the systematic relations of the other branches suffice.

The functions of the heart and lungs are the fundamental functions of the body. Upon them the welfare of all the other functions depends. It is the aim of Swedish educational gymnastics to develop these fundamental functions and it endeavors to attain this end by a series of movements of the voluntary system which shall be so arranged and executed as to bring about a healthy response between the muscles and the will. It does not strive to develop physical specialists, but only to train the different organs of the body in a manner that may serve the great double purpose of promoting the efficiency of the circulatory and respiratory functions and of increasing the volitional control of the whole body.

Throughout its entire course the Swedish system of gymnastics proceeds upon the well-grounded theory that muscular strength must follow as the necessary consequence of a training so carried on as to promote the health and strength of these fundamental functions. Those who labor only to enrich the muscles often make piteous beggars of the heart and lungs. Theory and experience show that a system of training may be followed, which, while it develops muscular strength to a considerable degree, at the same time causes dilatation of the heart and lung-cells, consequently making their walls thinner and weaker. Upon such a training common sense stamps the seal of disapproval. Our clergymen proclaim to us the moral rule: "Get the heart right!" I would embody in the same words a physical rule: Get the heart right and the lungs right and the muscles will meet every reasonble demand. This is the teaching of experience.

Muscular work is resistance of muscular contraction. Such a resistance becomes a healthy training for the muscles concerned whenever they are furnished with a sufficient supply of well-oxygenated blood and a proper drainage of the waste products. Whoever would understand the systematic progression in training under Ling's gymnastics must keep this general idea always clearly in view.

Were the main object of physical training but to develop the strength of the muscles, then the systematic progression of exercises might be expressed by an ascending numerical scale, representing in pounds the resistance against the muscles. Were swiftness the aim, we could make our training conform to a progressive scale representing a certain number of oscillations in a given time, or if slowness were the object, by a similar retrogressive scale. Did we aim at complete control of the curvilinearity of the movements, we might symbolize the progression by a series of peripherical segments, or were angularity of movement the aim, we could resort to a series of angles. We find in many systems, and so-called systems, of gymnastics, present and past, one or the other of these points put forward as the governing object. The Ling system does not lay especial stress upon any of these points. It employs reduced as well as increased resistance, as the purpose may demand. It uses the swift and the slow movements for such effects as they can respectively produce. It embraces movements describing both curved lines and angles.

For a clear understanding of gymnastic progression we must bear in mind the general composition of the Swedish gymnastic drill, or what is termed a "gymnastic day's order." (Gymnastisk dagöfning."—Swed.) "Gymnastic day's order" is a technical phrase that indicates something more than an ordinary space of time occupied in gymnastic exercises ; it is the practical, distinctively formulated expression of a clearly comprehended idea, a practical application of a distinct hygienic and educational line of thought. The "Gymnastic day's order" must be adequate to the demands of each day's exercise within given limitations of space and time. It is composed of a certain number of movements succeeding each other in a well-defined order, calculated to produce certain effects in a certain succession, all these movements together being designed to bring about a distinct hygienic and educational result, which is the exponent of what we term gymnastic "unity" and "totality."

Hygienic and educational interests are interlaced with each other in the "gymnastic day's order," as may be seen by an analysis of its constituents. The hygienic line of thought in the "gymnastic day's order" is this : For a number of hours previous to their appearance in the gymnasium, or class-room for physical exercises, the pupils have had all their powers concentrated upon their lessons and recitations. Whether necessary or not they have been doing their work in a sitting posture, the chest more or less contracted, the upper part of the body leaning forward against the desk, the thorax bent forward and downward, pressing downward upon the abdominal organs and somewhat checking the venous circulation of these organs. This state of injurious muscular repose has continued for hours. As a consequence we have these results : A more or less temporary passive congestion, or tendency to such congestion, of the brain and abdominal organs, decreased respiration, the general tone of the muscles lowered, and the mind tired from prolonged concentration. The first object of the gymnastic drill must be to counteract these evils, to relieve the brain and the oppressed organs, to reinstate a healthy respiration and circulation ; to tone up the body generally, at the same time giving attention to the educational purpose of the exercises.

To accomplish this object we have first in the day's order a class of movements termed "*Order-movements,*" intended especially to attract the minds of the pupils away from these lines of thought in which they have been so long occupied, to the approaching gymnastic work, to induce them to assume that fundamental position and carriage best suited to the physiological interests of the body, from which all correct gymnastic movements start and to which they return, before a relaxed position of rest is resumed.

Following this first class is a class called "*leg-movements,*" intended to draw the blood in larger quantities down towards the lower extremities, thereby relieving the brain and the oppressed organs. These also stimulate the general circulation.

Next follow movements called "*strain-bending movements*" and "*heave movements*" which expand the chest and induce deeper and more energetic respiration.

The combined result of these four typical gymnastic movements in the order mentioned is this: More and better oxygenated blood is carried to the muscles and the venous drainage correspondingly facilitated; the mind is relieved from its previous strain and the will is concentrated upon the muscular response. These results unite to form a most favorable general foundation upon which to ground the following more specific movements.

These succeed each other in the following order:

"*Balance-movements,*" which bring about a coördination of muscular contraction in all parts of the body, and by demanding equilibrium in difficult positions, train the sense of correct and graceful posture.

"*Movements for the back,*" which correct the carriage of the shoulder-blades and back, and, by equalizing the strength of the muscles on both sides of the vertebral column, counteract the faulty growth of the spine.

"*Movements for abdomen and forepart of the body,*" which stimulate the abdominal organs by an alternating increase and decrease of the abdominal pressure. The movements strengthen the muscles of the abdominal walls, as do also the next following, called the "*alternate side movements.*" These last train the legitimate mobility of the ribs and vertebrae and mechanically stimulate the spinal nerves.

The movements mentioned above follow each other in the order named, and are performed with gradually increasing force, compelling stronger and stronger action from the circulatory and respiratory organs, but never exceeding a certain point, which I will term the *optimum*, the test of which is a deep, free, undisturbed respiration during the movement. This must never be pushed to the highest possible point, or to the point where breathlessness and uncomfortable heart-action begin to appear. Whenever the extreme limit is approached by any vigorous movements the effects are immediately moderated by administering movements that quiet and normalize respiration and heart-action.

By these movements the system is prepared for the next following: These are the more vigorous exercises of running and jumping, which bring about a compound action in all parts of the body, involving a high degree of exertion during a short space of time, approaching, but never exceeding the limit where breathlessness in its graver form sets in. Within this limit there is put the highest demand upon the heart and lungs and the climax of complication for training the coördination of muscular work is reached.

With these movements the culmination of the day's order is reached, after which the accelerated action of the heart must be normalized and the body prepared for rest. This is accomplished by slow, measured "*leg-movements*," accompanied by deep, rhythmic breathing movements.

Interwoven with this hygienic line of thought is carried out an educational progressive idea in the same movements, which by their gradually increasing intricacy help towards a complete volitional control over the muscles of the body. Let us take jumping for an example. In jumping the greatest demand is put upon the heart and lungs. There, as in the advanced "*balance-movements*," the complexity of the movement, if it be correctly performed, demands a degree of exactness in muscular coördination that raises the volitional control of the muscles to the highest point. And so we find in each day's order expressed what we call a "gymnastic progression." But in the overlapping yet distinctive series which follow each other from day to day and from week to week and from month to month, and from year to year, each day's order should in a measure pave the way for the other more difficult and laborious ones that are to follow. To accomplish this there should be, as time advances, a gradually increasing demand for efficiency in the respiratory and circulatory functions, and also a constant demand for increased volitional control.

This general increase in the efficiency of the gymnastic day's order may be brought about by an increase in the number of single movements, or an increase in their laboriousness, or both. The increase in the number of movements must be subject to such restrictions that it shall not disturb the general purpose of the day's order. Within these restrictions, however, there is sufficient freedom to allow the teacher to bring his personality into the systematic work.

Between each of the movements in the days's order there is allowed a moment of complete relaxation, and the typical classes of movements already described are interspersed with a number of auxiliary movements which must be called into operation as a means of relief after the stronger movements by which the action of the heart and lungs has been greatly increased. But we must bear in mind that while the single movements should act together towards the great general aim of the day's order, they have also a specific purpose of their own, and the progression must be arranged with regard to both these points.

For example, the "*leg-movements*" while having their office in the service of the gymnastic day's order, help also to develop the muscles of the leg, to train the response of these muscles to the will, to check uncalled for coöperation of muscles that are anatomically and physiologically separate, to develop the muscular sense of the foot and leg with special reference to gait and firmness of position. And so the "*heave-movements*," while they widen the chest, develop the respiratory functions and induce deep breathing, have the additional effect of training the muscles of the shoulders and arms. And so on through all the single movements.

The efficiency of the single movements may be increased by a progressive increase of muscular resistance, that is, by increasing the labor which the working muscles have to perform within certain limitations ; or by gradually increasing the duration of the muscular work, or by gradually shortening the period for the same amount of work, or by increasing the frequency of repetition of the movements, or by increasing the complexity of the movement, that is by combining the same movement with more and more difficult positions, or combining the same position with more and more difficult movements, or by combining gradually more difficult positions with more and more difficult movements.

The increase of muscular resistance can be brought about in various ways. In Swedish institutions for medical gymnastics we make use of either manual resistance by another person, or machines especially devised for this purpose, are employed to resist muscular contraction. In the schools the aim is not a therapeutic one, but it is two-fold, hygienic and educational. We have to deal there not with individual patients but with classes of boys and girls representing a certain average standard of health and development. We must be prepared to direct at the same time, if need be, a class of two hundred persons or more. This is necessary not only for the sake of greater convenience, simplicity and economy, but for the all-important reason that the coöperation of many individuals brings to our aid certain educational principles of such intrinsic value that they may be considered indispensable.

The muscular resistance must of necessity be arranged in a somewhat modified form while working under these complications. Ling deduced this principle, in Swedish Educational Gymnastics to let one part of the body by its weight resist the muscular contraction in another part. Every active movement involves a certain amount of resistance. In the flexion of the elbow for instance, the muscles called into action have to overcome a resistance equal to the combined weight of all the segments of the arm from the elbow-joint to the last phalanges, multiplied by the imaginary lever from which this weight is suspended at the elbow-joint, and added to this product, the resistance made by the friction of the joint and the resistance made by the antagonistic muscles. Varying the position the amount of such resistance can be made greater or less by lengthening or shortening the lever, or by changing the friction in the joint from assistive to resistive and *vice versa*.

This principle is followed out in the details of the arrangement and execution of these movements of the Swedish gymnastics. The apparatus used in Swedish gymnasia assists in bringing the body into varying positions that grade the amount of resistance to suit the purpose. For example, the resistance to the flexor muscles of the fore arm can be increased along a scale ranging from the amount of contraction needed to raise the fore-arm and hand to that required to lift the whole body, But whether the resistance be given by the hand of another person, by a machine, or by the leverage of another part of the body, the degree must always be commensurate with the individual conditions, and it should not be increased so as to call into operation the *maximum* or highest power of the pupil. The most favorable amount, or the *optimum*, is always somewhat lower, and the practical test for this *optimum*, as given by Ling, is that the movement must be performed with full, free breathing and with accuracy, that is to say without shaking or disturbing interference from other muscles. It is the purpose of the training to gradually raise the *optimum*.

Movements with even a lower resistance than that caused by the segments moved, are also used in Swedish gymnastics, indeed it may be reduced to nil and the movement be entirely passive. But these movements are made use of for certain purposes that do not fall within the field of educational gymnastics, but belong to medical gymnastics. The resistance employed in Ling's gymnastics, therefore, is graded between zero and the weight of the body, which for an average man would be equal to a pair of dumb-bells of one-hundred and fifty pounds weight together.

Finally, an important side of the gymnastic progression is expressed in the training of a number of pupils to *coöperate* in movements of a gradually increasing complexity, as illustrated in *marching evolutions*, *gymnastic games*, and *gymnastic dances*.

The marching evolutions demand of every pupil entire control of himself, that he may be able to move in correct pose through distinct lines and angles. The correctness and beauty of the evolution depend upon the close attention of each member of a line to the movements of the other members, and in striving to keep his movements in exact harmony with theirs, and his line in exact harmony with the other lines executing the same evolution. This complexity demands exact coördination of the functions that regulate the movements. Furthermore upon the moral side it offers an entertaining variation from some of the other constituents of the gymnastic day's order.

In such movements as jumping for instance, each pupil works independently of the others and is to a certain extent permitted to yield to his natural desire to outstrip his companions. Freedom, independence, and competition, suggest themselves. But the pupils are allowed to indulge their desires in this respect only after their bodies, by foregoing preparatory work, have been made ready for, and worthy of, such more pleasurable and exciting trials, by compliance with all the requirements of the foregoing movements. We thus make one department of the day's order a prize for good work in the others.

In the marching evolutions there is still another lesson to be gained. It is a moral lesson that appeals to our sense of justice, teaching the mutual reverence and respect that are due to our fellow man. The marching evolutions demand for their success that every pupil, it matters not how superior he may be in individual competition, shall keep his shoulders in a line with his perhaps less fortunate brother, or sister. This suggests fraternity and interdependence for coöperative purpose, and mutual submission for joint benefit and common success. Let us not underestimate the value of this moral lesson interwoven with all the other benefits in the gymnastic day's order and suggested to the pupils throughout every day's gymnastic drill.

Gymnastic games are a form of applied gymnastics. They occupy, in relation to the gymnastic day's order, about the same place as running and jumping, although representing a more advanced stage. They have that in common with running and jumping that they bring about the joint efforts of all parts of the body, while the previous classes of movements in the gymnastic day's order, are all more or less localized upon a special part. But this generalization of the exertion is carried out in gymnastic games to an extent which in jumping is only vaguely suggested. In order to understand this clearly we must analyze these forms of exercises not alone from the physical but also from the psychical side.

All the movements which I have represented as constituents of the gymnastic day's order, from its beginning up to running and jumping, as also the movements that follow after jumping and end the day's order, are executed in accordance with commands given by the leader of the exercise which demand close attention. The full significance of the words of command is not exactly understood by considering them as merely a means of simplifying the work. They can in a measure be compared to gymnastic apparatus, in its relation to gymnastic exercises. Gymnastic apparatus as I have already suggested, assists in localizing and grading the physical work. The words of command assist in bringing about a mental localization, or rather an intellectual passivity and direction of will-power towards the gymnastic exercises. They should obliterate all necessity for the pupil to occupy his intellectual force in deciding what is to be done, the teacher having that responsibility. His mental efforts should be spared so as to enable him to localize and concentrate all his volitional powers on the physical side throughout all the movements of this character. Any teacher knows that in drilling in language or mathematics, if there is to be success the volitional powers of the pupil must be localized and concentrated upon the mental side and that his attention must be directed towards the object of the teaching. It should not surprise us that in physical drill for educational purposes there is a parallel condition.

In gymnastic games, which presuppose a certain already acquired proficiency in physical culture, there is a more general distribution of the physical as well as mental work. There the rule of the game itself acts as the rigid disciplinarian who commands what shall be done and decides the exact time when it shall be done during all the varying chances of the game. But all these chances must be perceived and measured by every participant, and both the perception and the conclusion must be simultaneous, and the execution of what is wanted must be instantaneous; it may be a swift run or a swift ball or a swift and vigorous lunge. In short there is combined a demand for swiftness and exactness of mind with swiftness and vigor and exactness in coördination of the physical exertions. In addition they bring in the stimulus of mental excitement. It will be understood then, why from the standpoint of Ling's doctrines, educational gymnastics proper are considered as the basis and necessary preliminary for gymnastic games and other forms of applied gymnastics. In Sweden there exists a rich supply of old games that have for a long time been in vogue among the peasantry and that have a great fascination for the youth. Still the whole branch of applied gymnastics has not yet received the same scientific elaboration as educational gymnastics proper, although great interest is manifested in that direction. Devotion to gymnastic games is encouraged as an advanced form of gymastics.

In Sweden fencing is extensively made use of as representing the educational principles involved in gymnastic games. Fencing, whether it be with foils, broadsword, bayonet or dirk, demands swiftness and exactness of perception and judgment, swiftness and exactness of action ; in short, it demands in its highest form that mental and physical coöperation which I have represented as the most essential characteristics of gymnastic games when considered from an educational standpoint. In the hundredth part of a second sometimes is decided the fate of the lunge, or cut, and the success of the contestant depends upon his ability to seize instantly the opportunity offered. Fencing, like gymnastic games, adds the stimulus of mental excitement. But fencing differs from the most popular games in several essential points ; it does not require acres of ground for a small number of pupils, it does not require hours of continued practice, but can be graded off in fifteen minutes, in ten, or five, as circumstances demand. In short the amount of excitement and exertion can be easily measured to suit the purpose and it can be brought into a gymnastic day's order, preceded by movements that prepare for this compound exertion, and succeeded by movements that prepare for repose.

Gymnastic dances are another form of applied gymnastics. They have this in common with both jumping and gymnastic games that they bring about compound coördinate actions of all the parts of the body. But the difference is an essential one.

Like gymnastic games they differ from jumping by bringing higher mental functions into operation with the physical exertion. But the mental component in the dances is of an entirely different kind. It is not quick, clearly comprehended thoughts that regulate the movements. It is something vaguer, richer, and fuller, something more concrete, less distinct. The aesthetical perceptions, the emotions and sentiments, take command and the positions and movements of the body become their expression. The aesthetical moment being preëminent this form of applied gymnastics approaches the aesthetical gymnastics and perhaps ought to occupy the same systematic relation to this branch as the gymnastic games do to educational gymnastics. I am obliged however, to confess that it is too soon yet to say much concerning gymnastic dances in connection with rational gymnastics. They have not yet received the scientific elaboration and finish that are necessary to prepare them for enrollment as a part of systematic gymnastics.

There exists however, even for this form of applied gymnastics an immense supply of rich material in the old Swedish folk-dances and this material has lately created an enthusiastic interest that promises well for the future. While I was a university student in Sweden there was a fresh movement among the young Swedes to rescue from oblivion the remains of a culture that had almost disappeared. Associations were formed among the students for the purpose of collecting from the peasantry the songs and tales, dances and games, that for so long a time have been the property of the people, and which have preserved through generations the characteristics of a peculiar culture. There is in those old dances an echo of that indestructible fresh good-temper and hardness of nature that form constituents of the old Swedish folk-character. It may give you an idea of some of these dances when I tell you that it is but about twenty-five years since, in certain provinces of the north of Sweden, a girl looked upon that man as inferior who could not kick twice his own height and in the dance lift her over his head while on his toes he moved his feet in time with the quick rhythm of the music, or who could not execute handsprings without losing a beat in the measure.

I spoke of music. The gymnastic dances are rhythmical. As already mentioned they do not call for intellectual reasoning. The movements must be done in harmony with aesthetical perceptions and sentiments, and this demands a certain amount of volitional relaxation. The movements must be those which by previous training have already become nearly automatic. It is only through this unmindfulness that they can meet the requirement of the aesthetical perceptions ; and to those same aesthetical perceptions is the music applied. The music consequently assists on the physical side in bringing about volitional passivity, awakening the aesthetic receptivity and in conforming the movements to the perceptions, just as in educational gymnastics the word of command brings about the volitional localization on the physical side and regulates the muscular work that shall be done in accord with the volitional impulses.

To one who has had the patience to follow this outline of the theory of Ling's system it will be obvious that in order to carry out a practical work in accord with its principles there is needed a detailed and thorough knowledge of the movements, their mechanism and reactions upon the body and mind. All structures of the human body must be studied in their relation to the movements, and all sciences that can throw any light upon the subject must be consulted. Normal and morbid anatomy, physiology, hygiene and therapeutics; natural, mental and moral philosophy, pedagogics, aesthetics, general and specific statistics,—all these have their share as auxiliaries when the subject of gymnastics is under consideration. Gymnastics is not a department of any other science. It is, and for the sake of its progress, it needs to be a cause in itself.

Only such movements are enrolled in the Swedish *materia gymnastica* as have a distinctly known effect, of such a character as to add value with reference to the gymnastic purposes which I have represented as embraced within the province of Swedish gymnastics. Ling's teachings are in discord with the adherents of the all-possibilities' theory, which advocates the practice of all movements that possibly can be performed, claiming that the very fact that a movement can be done proves sufficiently that it is beneficial to practice it. Ling made clear his standpoint on this question by the simple words: "We must not swallow everything that can possibly pass the throat." We select food according to dietic principles and taste, so we must discriminate between the movements which we enroll in our gymnastics. Many of the possible movements interest us only as material for our studies. Certain of them are selected, others rejected. In the first place, those are eliminated which are considered injurious, as for instance such movements as contract the chest, or those which produce a long-continued pressure upon large blood-vessels, or otherwise cause too long increase of local blood-pressure in some region of the vascular system, or those that produce such a pressure upon the larger nerves. All movements that have tendencies to produce faulty posture or deformities are properly discarded.

After selection upon such principles there still remain many which while harmless, are of no distinct gymnastic value, as for instance, stretching of the tongue in different directions in accord with words of command. Such movements are left to the gymnastic pharmacopoeia of the all-possibilities' school.

After such a process of elimination there yet remains a sufficiently high number for allowing of infinite variety. If we begin to compute them we shall very soon reach figures that add thousands to thousands.

The selection of movements together with the gymnastic progression expressed in the gymnastic day's order, form together the characteristics of Ling's system.

Gymnastic movements however complicated are resolved, in the last instance, to some sixty elementary motions. Only a few gymnastic movements are the direct product of simple elementary motion in one joint. They are composed of two or more motions in several joints, and the most complicated are composed of a great number of elementary motions in nearly all the articulations, brought into coördinate action. It may not seem strange if I state that the number of such combinations is infinite. The whole infinite variety of things which we perceive by our senses is made up of less than seventy material elements. The combinations of these form the great material mass of the universe; or, if I may be allowed another figure: In a language, all the words of the vocabulary are composed of a comparatively small number of elementary sounds, by the combination of which in different numbers and different relations, all the ideas can be expressed which together form the intellectual treasury of a people. The English language for instance is built up of less than seventy elementary sounds. By these there can be produced combinations in infinite manifoldness and variety. Out of this great mass only some one hundred thousand combinations have been selected of such character that they are adequate to suggest ideas to the mind and assist in their comprehension and expression. To these comparatively few combinations for the expression of ideas is due the powerful development of the Anglo-Saxon brain.

And so by the sixty elementary motions of the human body there can be produced combinations in infinite number. Out of this ocean of possibilities the Swedish educational gymnastics has selected those combinations which suggest gymnastic ideas and which help towards the fulfillment of gymnastic, hygienic, and educational purposes. Thus these movements form an arsenal of physical agents or, if you will allow me to so express it, they place along side the vocabulary of *literal* formulas, another vocabulary of *physical* formulas, which from the muscles reach the brain, as do the words through the eyes and ears, and by so doing they may be credited with aiding on the physical side to develop the efficiency of the brain and widen the boundaries of the volitional dominion of individuals, and through them of the nation.

THE PHYSICAL TEST OF A MAN.

BY D. A. SARGENT.

During the past ten years an interest has been awakening in our higher institutions of learning, concerning the physical examinations, and measuring and testing of students. This interest has been undoubtedly stimulated by the scientific spirit of the age, which seeks to measure all that is measurable, and to weigh all that is capable of being weighed. Thoroughly imbued with this idea, many have persisted in the work of examining and testing men, women and children of all classes and conditions in life, whenever an opportunity presented.

The questions often asked concerning these examinations has led me to think that the subject may be one of general interest. I, therefore, invite your attention to a consideration of some of the reasons for making these examinations, of methods of tabulating the data obtained, and of the significance of the facts brought to light. In so doing I shall offer some criticism on the work of others, quote my authorities, and endeavor to defend what seems to me the right position to take with regard to this subject.

One of the objects I have kept constantly in view in making physical examinations has been the collection of data, as a preliminary step to the establishment of an intelligent system of Physical Training.

The past century has been very profuse in its elaborations of movements and exercises for the development of the human body, while it has left us a very meagre amount of information as to the physiological effects of these exercises. We are told to follow nature's plan and to exercise for symmetry and harmony in development—to enlarge the chest, straighten the spine, etc., but no one has taken the trouble to ascertain what nature's plan is, and to give us the natural proportions of the body and the correct curves of the spine, proper size of the chest, etc.

It is also quite fashionable among a certain class in our community to decry athletic games, and gymnastic feats, and to advocate exercises merely as a means to health.

What is health? Is it simply absence of disease? If so, all persons not actually ill are in health, and need no physical training. In the practical affairs of life, health means something more than the ability to keep out of the physician's hands. It means the ability to do, which comes from doing, in other words, health, as some one has aptly expressed it, "is the faculty of performing all actions proper to the human body in the most perfect manner."

What most concerns us is the outward physical signs of health. We want to know them when we see them. The only way to ascertain nature's plan is to study nature in all its phases. We must observe, measure, weigh and test mankind under all conditions and circumstances, if we would gain the necessary data for forming correct conclusions.

In pursuing this—the inductive method—we not only rescue the science of physical training from the charge of empiricism, but we gain at once a positive knowledge that enables us to correct old theories, and deduce new principles for the guidance of those who are seeking light on this subject.

In making physical examinations we meet at the outset three elements that exert a modifying influence on the development of the human body: age, sex and race. If either factor is given, the others must be known before a correct interpretation can be placed upon the measurements. It is desirable to know the size the body ought to be at a certain age, at what periods the bones consolidate, and the heart, lungs and viscera attain their full growth and power.

An exercise which would be perfectly harmless at one age might be highly injurious at another, though all the physical signs of health were present. Thus a young man might engage in a boat race at 22 who could not do so with safety at 17 or at 35, for entirely different reasons.

Anything that interferes with nutrition, or that checks vital action, between the ages of 12 and 14 with girls, and 14 and 16 with boys, is of more serious moment than the same interference at another age, because these are the periods of greatest growth, and a set back then might lead to a permanent arrest or diminution of the full development.

This leads me to speak of other agencies that exert a modifying influence over the conformation of the body, as climate, surroundings, occupation, nurture, habits of living, disease, etc.

Climate is one of the forces that has given to different races their characteristic development. Exposure to extremes of temperature, proximity to the sea or to the mountains, different foods, atmospheric conditions, etc., all have contributed their share towards making the Laplander average in stature but 4 feet 11 inches, and the New Zealander 5 feet 9 inches.

Want of sanitary surroundings interfere perceptibly with growth and development, and make it difficult to attain the best physical results in the city. In spite of its many disadvantages, the country still leads in the production of strong, able-bodied men.

The evil effects of occupation is often due to the circumstances and conditions under which it is carried on. Cramped positions at the bench and desk, faulty attitudes while standing and working, the almost continuous use of the muscles in one part of the body and the disuse of those in another part, all tend to misshapes and deformities that are easily recognized by the physical examiner. The influence of nurture, that is of food, clothing, rest, etc., and the comforts of life that come with accumulated wealth, exert a beneficial effect on the physique.

There is a difference in the average measurements of the professional, commercial, laboring and industrial classes that must be taken into consideration in estimating the physical standing of a community, a school, or an individual. My attention was called to this fact some time ago by the report of a school in the city of Brooklyn, N. Y. This report undertook to prove by physical measurements that the system of calisthenics conducted at this school was superior to that of any system used throughout the country, as shown by the greater average height and weight of its pupils when compared with those of the same age, in the same conditions of life, in other cities. For instance, it was stated that the pupils in this Academy, which represent a select class, greatly exceeded in stature and weight those of the same age attending the Institute of Technology, and the Latin and private schools of Boston. The comparisons were actually made, however, with the figures giving the average measures of the pupils of the public schools of Boston, who average from one to two inches less in height and from five to twenty pounds less in weight, according to the age, than the pupils in the Institute of Technology and private schools. This shows how necessary it is in anthropometric work to make sure of the premises before attempting to draw conclusions.

Correct habits of living improve the body, while the use of tobacco, alcohol, and all forms of dissipation in youth, tend to check growth, retard development and impair the central nerve force.

Disease leaves its stamp upon the organism, and though confinement to a bed for several weeks sometimes seems to stimulate growth in height, there is no evidence that the body is generally improved. On the contrary, there are malformations of the chest, thorax and limbs, growing out of the simple disorders of childhood, which, unless corrected, often incapacitate the individual for any great efforts in adult life. There are also certain acquired shapes of the body that tend to invite or accompany disease—such as the consumptive chest, etc.

It is important to note the abnormal features which furnish the physical basis for other forms of disease, and to discover, if possible, the peculiar type of body most favorable to general good health and longevity.

Dr. Sieveking, of England, in his instructions to medical examiners in life assurance, states: "The greater advance we make in inquiries into the physical signs of health, the more perfectly is the law of proportion, that governs the typical man, demonstrated, rendering it equally apparent how undue or imperfect development of any one organ or function throws the remaining organism out of gear, and constitutes a greater or less tendency to disease."

Another application of the measurements is to ascertain the physical conformation of those best fitted for special service in the practical affairs of life.

Knowledge gained from physical examinations and measurements has long been applied in recruiting men for the armies and navies of the world, and we are just beginning to use what data we have in the selection of policemen and firemen.

As time progresses and our statistics accumulate, the information brought to light will be applied to other branches of the civil service to enable the examiners to select the best men for special occupations.

The physical characteristics of men distinguished for great speed, strength or endurance, as brought out in the practice of athletic sports, are becoming manifest through our measurements of champion athletes.

In connection with this fact, it may be interesting for you to learn that photographs of some of our typical athletes have been recently sent to Germany, to assist the curator of one of the large art museums in his attempt to classify Greek statuary.

This is not only complimentary to American athletes, but it indicates the conviction of scientists of the unity of man, and the belief that exercises practiced in the nineteenth century will be followed by the same results as were realized by the practice of similar exercises over two thousand years ago.

Perhaps the strongest argument that can be urged in favor of measurements of women is the aesthetical one. They need some other standard of beauty and symmetry of figure than that furnished by the fashion plates and corset advertisements of the day.

In spite of the abuse in the use of clothing to which most women have subjected themselves for centuries, I am glad to be able to state that the typical woman as shown by several thousand measurements in my possession, is not quite as ugly in her lines and contour as the dress she often wears, would lead one to infer.

Nature will stand a great deal, and it is often as difficult to establish a permanent defect as it is a permanent improvement.

As women are born of the same parents that have produced men, so their measurements, *en masse*, are as true to nature as men's are, and though the normal standard for woman is low as compared with man's normal, and both below what they should be in the opinion of the idealist, still we cannot help thinking that they form a more reliable standard for comparison, and better models to build from, than any artificial normal, though it may have the lines and proportions of a paragon.

Many other reasons of a thoroughly scientific and practical nature might be given in favor of physical examinations and measurements. The anthropologist, the physician, the sculptor, the artist, the statesman, the social reformer, and the educator, will all be able, eventually, to draw conclusions from the deductions of the anthropometrist that will aid them in the pursuit of their respective professions.

The measurements and tests usually taken to ascertain the physical proportions and conditions of the typical man, are given in the printed sheet.

To many of you it will seem that there are more observations made than are necessary to reach an intelligent conclusion, and to others it will occur that certain observations might be added. The form now used has been built up by experience, one measurement after another being added, as necessary factors for ascertaining the true significance of such observations as had been made. For instance, the weight is of no importance without the height. The height gives us no key to the man's physical status, unless we know the length of the parts composing it, such as sitting height, length of thigh, leg, etc.

The size of the head gives us no evidence of ability to generate nerve force and sustain energetic action, unless we also know the girth of the neck, chest, etc. Here again we are without the necessary factor, for the large chest measurement may simply indicate large pectoral muscles, and not great lung capacity. So we take the girth over the ninth rib, in order to get at the actual amount of chest mobility. If the size of the waist is wanting, we do not know but what this liberal supply of oxygen is feeding the excessive combustion that accompanies corpulency in motion. If the size of the waist is known and the girth of the hips not given, we do not know the dimensions of the working base of the thorax and spinal column.

And what is the significance of the knowledge thus far gained unless we know something of the limbs that support the trunk and supply its wants? Then we take the girth of the thighs. But all muscle measurements are misleading, unless we learn the size of the joints, length of the levers, points of attachment, and direction of the force applied. So we might go through the entire list, showing how knowledge of one measurement presupposes knowledge of another, and that unless this is ascertained, the all-important thing—the co-relation—or the mutual and reciprocal relation of the parts composing the human body cannot be known.

These measurements, as numerous as they are, have to be supplemented by other information which the tape and calipers fail to give. The condition of the skin, the muscles, the spine, the position of the head and scapula, the relative height of the shoulders, the peculiar formation of the chest, and a hundred and one things that are revealed to the eyes of an acute observer, have to be taken into consideration and recorded.

After the state of the circulation and respiration has been ascertained, we may be said to have gained a fair idea of the potential equation of the man. Whether he comes up to the estimate which we have formed of him from personal observation, and the measurements, can only be determined by an actual test.

Before making this test, however, it is well to look over the history paper, lest there should be reasons that the test should not be made, or that would account for some peculiarity or inconsistency brought out by the observations, which would cause us to modify our expectations.

Assuming that all the measurements, tests and observations have been correctly made, the next important step is to tabulate the data thus obtained and see what we can learn from it that will be of interest to the community and of value to the individual. There are three ways of tabulating measurement data now in common use. The first is to take the measurements of a few ideal figures or models, arrange them, and then calculate the relation which one part of the body bears to another. This is generally accomplished by finding what per cent. certain other parts are of the height, the height being taken as a standard.

The more commonly accepted canons among artists, however, are those based upon the supposed occult relation of any one part of the body to all the other parts. "Given the dimensions of a part, the remaining dimensions could all be educed from a geometric diagram."

Some of these relations such as that the total height should equal the stretch of the arms, that the foot should be one-sixth of the stature, the biceps the same size as the calf, and many other equally absurd deductions are still used by many artists and gymnasium instructors.

The fault of such a standard is a fundamental one. It begins and ends with one man's conception of what nature ought to be, rather than what nature is. Although such a standard may be of value to the artist, it is of little service to the scientist.

Another method classifies the measurements according to age, and then averages them. Drs. Hitchcock, father and son, from whom you heard this afternoon, deem the data obtained in this way unreliable, and have adopted a classification based upon height as a standard.

In a paper published by Dr. Hitchcock, Sr., on "The Needs of Anthropometry," he says: "We cannot use age as the standard, since so many different weights, sizes and powers are found at the same age, and what might be adapted to the person of 25 would be inadequate for the youth of 15." He might with equal truth have said: We cannot use *height* as the standard, since so many different weights, sizes and powers are found at the same height, and what might be adapted to the person of 6 feet stature, who is 25 years of age, would be inadequate for the person of 6 feet stature who is only 15.

The chief defect in the tables that Dr. Hitchcock has presented to us to-day, is that they make the short men too heavy and the tall men too light; they do not show us the natural correlation of the different parts, nor give us the true curves when plotted—in other words, they are at variance with nature.

As the question "What shall be our guide" is more discussed at the present time by those taking measurements than any other, a few words illustrating my criticism will, perhaps, be acceptable. For a height of (160) 5 feet 3 inches, Dr. Hitchcock's tables make the weight to be 118.8 lbs., while for a height of (183) 6 feet, the weight is given as only 150 lbs. Now using the commonly accepted factor, 2.323 lbs., for general population to ascertain the weight when only the height is given, we find the calculated weight for a 6 feet man to be 167.25. My own data gives it as 165.3, and Galton's table gives it as 162 lbs. In the table under consideration the relation of weight to height is extremely irregular, and the range of differences between the short and tall men exceedingly small. For instance, he makes the difference in weight between a 63.4 inch man and a 64.6 inch man to be only 1.54 lbs., while the difference in the weight of a 65 inch man and a 65.4 inch man (not a half inch more), he makes to be 3.96 lbs., and between a 65.7 inch man and a 66.1 inch man (again less than one-half inch in height), he makes a difference of 4.84 lbs. in weight. While from a 66.5 to a 67.7 inch (1.2 inch difference) the difference in weight is .44 lb., less than ½ lb., and a man 67.3 inches tall is actually .44 lb. less than one who is 66.5 inches tall.

If this table is to be a guide, a man 67.7 inches must weigh 7.3 lbs. less than one who is 69.3 inches high, while a man who is 70.9 inches high must weigh the same as a man who is 72 inches.

In the girth of chest in repose the range between men of 63 inches and men of 72 inches is only 1.96 inch. It should be over 6 inches. In many instances men of different stature have the same chest girth, but in men ranging from 63.8 to 64.2, only 0.4 inch, there is a jump of .48, and in men ranging in height from 71.3 to 71.7 inches (again only 0.4 of an inch), the increase in chest girth is .56, or actually 0.2 of an inch more than the gain in stature.

In comparing the difference in stretch of arms in men of different heights, we find that a man 63 inches high stretches 65.4 inches, (a gain of 3.1 inches,) while the next man 63.4 high stretches 66.5, (a gain of 2.4 inches). While men of 68.5, 68.9, 69.3 and 69.7 do not stretch any more than the men of 68.1 inches. In other words, a man 69.7 inches high gains but half as much as one 66.5 inches.

In the horizontal length the differences are still more marked. The tables make men varying from 63 inches to 66.5 inclusive, (a difference of 3½ inches in height,) measure from .4 to .8 inch more in horizontal length, but the men 66.9 inches tall stretch out to 68.9 inches, a gain of 2 inches, in passing from the erect to the horizontal position. While men who are 70.1 inches tall gain nothing, and men who are 70.9 inches drop back to 70.5, and the men who are 71.3 tall also drop to 70.5—that is they really lose from .4 to .8 inches in height respectively.

It seems hardly necessary to make further comment on these tables. All the measurements tabulated show similar inconsistences. And yet Dr. Hitchcock is a careful man, and I am willing to assume that all the measurements were correctly taken and correctly tabulated. Consequently we are driven to conclude that any tables based upon a system of averages, where the height is made the standard, is unreliable and misleading. I came to this conclusion in regard to all averages over five years ago, and have used the mean in preference to the average in tabulating data ever since.

I regard this as a matter of the greatest importance to physical educators. If measurements are to be accepted as a guide and assistance by those directing the physical exercises of youth, it is very desirable that these two terms, mean and average, as they are used in anthropometrical work be thoroughly understood. In defining these terms in his Anthropometry, Mr. Charles Roberts says: "An average is obtained by dividing the sum of the values observed by the number of observations, while a mean is the value at which the largest number of observations occur. Thus the average height of a number of men of different stature is obtained by multiplying the various heights by the number of men at each height and dividing the sum of these heights by the total number of men. The mean height on the other hand is obtained by arranging the men in groups, and noting the height of the group which contains the largest number of individuals. The average height is the measurement which each and all the men would possess if the tall ones could be made shorter and the short ones taller, and the predominancy of a few very tall or very short men would determine the relative value of the average height. The mean height is the central or typical height which the men possess, and is the height which all of them ought to be, and probably would be, if their growth had not been interfered with by accidental causes.

An average includes, and is influenced by exceptional cases, while a mean excludes and disregards exceptional cases, and is consequently uninfluenced by them."

Dr. Edward B. Taylor, author of the recent work on Anthropology, says :—" The population of a California settlement made up of whites and Chinese might show two predominant groups, one of 5 ft. 8 inches, the other of 5 ft. 4 inches, corresponding to the two racial types.

It need hardly be said that this method of determining the mean type of a race as being that of its really existing and most numerous class, is altogether superior to the mere calculation of an average which may actually be represented by comparatively few individuals, and these the exceptional ones. For instance, the average stature of the mixed European and Chinese population just referred to might be 5 feet 6 inches, a worthless and, indeed, misleading result."

Sir John Herschel says :—" An average may exist of the most different objects ; as of the height of houses in a town, or the sizes of books in a library. It may be convenient to convey a general notion of things, but it involves no conception of a natural and recognizable central magnitude, all differences from which ought to be regarded as deviations from a standard. The nature of a mean, on the other hand, does imply such a conception, standing distinguished from an average, by this feature, namely, the regularity of the groups, increasing to a maximum and then diminishing. An average gives us no assurance that the future will be like the past ; a mean may be reckoned on with the most implicit confidence. All the philosophical value of statistical results depends on a due appreciation of its consequences."

In his book on "Natural Inheritance," Mr. Galton says ;

"The knowledge of an average value is a meagre piece of information. How little is conveyed by the bare statement that the average income of English families is £100 a year, compared with what we should learn if we were told how English incomes were distributed; what proportion of our countrymen had just, and only just money enough to ward off starvation, and what were the proportions of those who had incomes in each and every other degree, up to the huge annual receipts of a few great speculators, manufacturers, and landed proprietors. So in respect to the distribution of any human quality or faculty, a knowledge of mere averages tells but little; we want to learn how this quality is distributed among the various members of the fraternity or of the population, and to express what we know in so compact a form that it can be easily grasped and dealt with." Considering the reputation of Herschel, Taylor, Roberts, and Galton, as anthropologists, it will not be necessary for me to quote further authority for adopting the *mean* as a standard in preference to an average in dealing with the measurements of men.

How is this obtained practically, some one may ask. By having all the measurements put upon cards, and then arranging the cards according to the figures given for the item under consideration. For instance, if we wish to ascertain the mean height of the persons in hand, all of the cards are distributed in packages, putting those nearest to 5 feet in one pack, those of 5 feet 1 inch in another, those of 5 feet 2 inches in another, and so on until all the cards are distributed. Then the number in each pack is counted, and the pack containing the largest number is the mean. As a matter of fact, however, in practice we distribute to the nearest centimetre instead of inch, consequently the packages are more numerous and the mean is determined arithmetically. If we should represent the number of cards in each pack by straight lines—like those drawn upon the board—and then connect their ends with a line, we should have what is familiarly known as the binominal curve, or the curve of the frequency of error. Now the most remarkable thing about the way a large number of persons of different heights will arrange themselves about a central height, is that the variation conforms to some regular law. This law is known, and is deducible from abstract mathematical investigation. It was first applied by Newton and Pascal to questions of astronomy and physics, but its sway is supreme throughout the whole domain of chance or hazards wherever this may extend. Francis Galton, in the work referred to, says: "I know of scarcely anything so apt to impress the imagination as the wonderful form of cosmic order expressed by this Law of Frequency of Error." The law would have been personified by the Greeks and deified, if they had known of it."

When we distribute our cards for weight, chest girth, capacity of lungs, and all the measurements on the list, we find them arranging themselves according to this wonderful law. If we should undertake to express it graphically for each measurement, we should have a series of parallel curves like those represented on the board. As these curves would be very awkward to handle, we have taken the numerical equivalent of the straight lines or abscissae, expressed in per cents, and constructed a plain table or chart, as shown by the illustration. Now, if you will imagine this chart filled in with measurements for each part that the different per cents of those examined surpassed, equalled or failed to reach, you will realize that we have ascertained not only how a community are distributed as to their height, weight, chest girth, and different measurements, but that we have a ready means of showing the individual just how he stands as compared with others, or as compared with different parts of himself. This is something we have never been able to ascertain until the present day for want of sufficient data.

Now what is the significance of it all, some of you will naturally ask. In the first place we have in this method a ready means of determining the proportions of the different types of the human species. We discover nature's plan of development, as it were, and learn something of the limitations and restrictions she puts upon her subjects as well as the advantages she extends to them.

The figure which corresponds to the measurements that fall upon the mean or centre line of the chart may not exist in flesh and blood, and indeed may never be actually attained, nevertheless it exists as a real entity. Perhaps the best illustration of it is what we should get from a full length composite photograph of a thousand or more individuals, if we were able to take them. Let us suppose that this thousand men were selected from the firemen of Boston. The very tall men would have been eliminated by examination, by disease, or by inability to handle their weight, if very heavy, in attending to their duties. The very short would also have been eliminated by examination (which might correspond to natural selection in the world at large), or by lack of sufficient strength and vigor to stand the burdens imposed upon them in following the life of a fireman. The result would be that the typical fireman would be a man about 5 feet 7½ inches, and weighing about 150 pounds, with other proportions to match.

If the same tests were applied to another class, the policeman, for instance, we should get a little different result; still we should find a central figure that represented that class, and then we might combine all classes and reduce them to a mean, which would represent the typical Bostonian of the present day. Such a man would not necessarily represent the survival of the fittest, but he would be the resultant of a great many different forces, natural, economic, social, sanitary, etc., and would personify the individual most likely to exist under present conditions. Now this is not very flattering to our vanity, nor to our hopes and aspirations for better mental and physical culture. If mediocrity is the type we are doomed to perpetuate, why should we struggle for higher ideals?

Let us first see why the typical man is mediocre in point of development, and then what our duty is in the matter. Those of you who have had experience in teaching physical exercises, or have watched the effect of practicing them upon yourselves, know how quickly the muscles respond to active work. We frequently hear it said that such a man increased the size of his chest four inches in as many months, and the dimensions of his limbs proportionally. We hardly ever hear it stated what this man accomplished at the end of four years, because some of us know that before that time he will have reached a point where further development will be impossible. The reason is well known to the biologist, but is not sufficiently considered by the physical educator. The reason that most persons stop at the mean in most parts in their growth and development is shown by George Lewis, in e his "Physical Basis of Mind." "At this point," he says, "a balance of the coöperating forces has been reached. Larger muscles, or more muscle fibres, demand arteries of larger calibre, and these a heart of larger size. With increase of muscle would come increase of connective tissue, and this tissue would not only compete with the muscle for pabulum, but by mechanical pressure would diminish the flow of that pabulum. The function of the muscle is thus dependent on the due balance of its component tissues, if that balance is disturbed the function is disturbed. Should, from any cause, an excess of muscle fibre arise, the balance would be disturbed. Should an encroachment of connective tissue, or fat, take place, there would be also a defect of function, as is seen in men who are beginning to train. Here we have the coöperation and limitation of the tissues illustrated; let us extend our glance and we shall see how the coöperation and limitation of the organs come into play, so that the resulting function depends on the balance of the forces.

The contractile power of each individual muscle is always limited by the resistance of antagonist which prevent the muscle from being contracted more than one third its possible extent. Not only the increasing tension of antagonistic muscles but the resistance of tendons, bones and softer parts must be taken into account.

Thus the increase of the gymnast's muscular power would involve a considerable increase in all the tissues of the arms, but such an increase would involve a reconstruction of his whole organism.

Whenever there is an encroachment of one tissue on another there is a disturbance of the normal balance which readily passes into a diseased state."

Another way of accounting for the persistency of mediocrity in size and development, is through the law governing the limitation of growth as set forth by Herbert Spencer:

"In similar-shaped bodies the masses vary as the cubes of the dimensions; whereas the strengths vary as the squares of the dimensions." "Supposing," says Spencer, "a creature which a year ago was one foot high, has now become two feet high, while it is unchanged in proportions and structure, what are the necessary concomitant changes that have taken place in it? It is eight times as heavy, that is to say, it has to resist eight times the strain which gravitation puts on its structure; and in producing, as well as in arresting, any one of its movements it has overcome eight times the inertia. Meanwhile the muscles and bones have severally increased their contractile and resisting powers in proportion to the areas of their transverse sections; and hence are severally but four times as strong as they were. Thus while the creature has doubled in height, and while its ability to overcome forces has quadrupled, the forces it has to overcome have grown eight times as great. Hence to raise its body through a given space, its muscles have to be contracted with twice the intensity, at a double cost of matter expended." Trace the working of this law in its effects upon nutrition, circulation, the maintenance of animal heat, etc., and we not only ascertain why large men and women are so few, but we also learn why most of them are defective in their vital organs, and often incapacitated for the work easily done by persons of smaller physique.

It is an established fact that the heart, lungs, stomach, liver, etc., do not keep pace in development with the muscular and osseous systems of persons exceeding the normal elevation. It is an old saying among athletes that a good big man is better than a good little man, but the truth is, that where we can find one sound and well developed man who is 6 feet tall, with other proportions to match, we can find dozens whose stature is in the neighborhood of 5 feet 8 inches.

Perhaps the fact that the typical man among us is of 5 feet 8 inches stature, with proportions to match, instead of 5 feet 10 or 11 inches, is owing to the influence of natural heritage. This brings us to one of the most interesting and important features of our subject. It has lately been shown by the researches of Galton in England and Weisman in Germany, each working independently of the other.

Galton shows conclusively from his data, that the sons and daughters tend to inherit the stature of the mid-parentage. Thus in regard to stature, if the father is 5 feet 10 inches, and the mother is 5 feet 1 inch, a son is likely to be 5 feet 7 inches, and a daughter 5 feet 3 inches. In other words, if both parents are above the normal, the children are more likely to be above the normal, if both are below, the children will be below, and if one is above and the other below, the children are likely to be at the normal. Owing to the law of regression, it is difficult to realize the full transmission of any gift, physical or mental. The more bountifully the parent is gifted by nature the more rare will be his good fortune if he has a son as richly endowed as himself, and still more so if he has a son who is endowed yet more largely. Mr. Galton does not mean that the children of a gifted pair are not much more likely to be gifted than the children of a mediocre pair, but he means that the ablest of all the children of a few gifted pairs is not as likely to be as gifted as the ablest of a very great many mediocre pairs.

This accounts for the fact that we hear so little of the sons and daughters of geniuses, and that our greatest men often spring from the common people.

Applying Mr. Galton's deductions to our measurements, we are forced to conclude that the mediocre members of a population, which are those represented by the mean measurements on the charts, are those that are most nearly in harmony with their circumstances and environments, and that the exceptionally large or exceptionally small persons have less chance of life than those of moderate size.

We have seen that nature has put a limit to development in certain directions. Weisman in his new theory of natural selection claims that an organ can not be perfected by exercise, unless the germ from which the individual arose was predisposed to produce a perfect organ. "We cannot," he says, "by excessive feeding make a giant out of a germ destined to form a dwarf; we cannot by means of exercise transform the muscles of an individual destined to be feeble into those of a Hercules, or the brain of a predestined fool into that of a Leibnitz or a Kant, by means of much thinking."

And Galton tells us that the average contribution of each parent to the heritage of a child is only one-quarter, and that of a great grandparent only one sixteenth, and that an ancestor as far removed as William the Conqueror (about 24 generations) contributes less than one part in 16 millions to the constitution of a man of the present day.

How the vain pomp and pretentiousness of modern aristocracy fades away under the light of science and truth!

Follow these theories out to an ultimate conclusion and we find that both the intellectual and physical supremacy of a people are dependent upon the intellectual and physical condition of the masses. In other words, the only way to produce the highest specimens of the individual, improve the condition of the race and better the quality of future humanity, is to raise the normal or mean standard of mental and physical development.

This cannot be accomplished by cultivating the extremes alone as represented by athletes and invalids. The former cannot hope to transmit at the best but one-fourth of his superior energy, and it would be better for the future of the race, if the latter did not transmit at all.

In terms of our chart the typical line indicates the course along which we must work and along which nature is tending. It is the line of least resistance to the process of evolution, and represents that class in the community which is the most susceptible of lasting improvement. To strive to elevate the condition of this class, and thus aid nature in its efforts to build up higher and nobler types of our species, I believe to be the duty of every intelligent being. It is only by so doing that we can hope to pay the debt that we owe to the struggling humanity that has preceded us.

Our people are just beginning to realize the importance of physical training, and are building gymnasia and encouraging athletics on every hand.

Perhaps no community is doing more in this direction than the one in which we are living at present. But how little that is. All that Boston is doing to-day in the way of physical training will not raise the mean standard of stature of the general population ¼ of an inch in one hundred years. Simply because too few persons are making any real physical progress against the forces that tend to check growth and development.

One-sixteenth to one-fourth are small items for one-fortieth of a population to contribute to the upbuilding of the masses. And yet this is a liberal estimate of what is being done in this direction. Something more is necessary in order to make physical training of any permanent value. We must use all the factors in the problem. In other words, we must make physical education an integral part of our common school curriculum, and we must improve the physical condition of our women.

These conclusions have been forced upon my mind with all the fervor of a positive conviction. In my opinion this course is absolutely necessary, not only to enable us as a people to make perceptible improvement, but to enable us to hold our own against a trying climate and a civilization that exhausts our bodies while it enlightens our minds.

DISCUSSION OF DR. SARGENT'S PAPER.[*]

Remarks of Dr. E. Hitchcock, Senior.

In regard to the criticisms of our honored President upon the Anthropometric Tables presented this afternoon, he wishes to express pleasure that some one has taken the trouble to review and to such an extent dissect them; much better than that they should die "unwept, unhonored, and unsung."

At the same time, the story of the boy laughing louder and louder when the schoolmaster flogged him harder and harder, comes in point here, because "he is licking the wrong boy."

The criticism which the Director of the Hemenway Gymnasium offers us to-night, is directed at the first attempt of Amherst College to gather together and put in shape some data gathered at that institution, relating to *Stature as a Unit in Anthropometry*. This table was put together more than three years ago for the first time, and was as exact a transcript of results as could then be made, with inexperience in making new tables and imperfect clerical assistance. And the analysis of this table of immature production by the Harvard Professor is in the main correct.

But as in the three succeeding years results from three to four hundred new cases each year have been secured, we have been able to correct errors and scanty data, so that a second and revised edition was issued in 1889. Not only this, but in 1890 we are able to add still another year's data, and offer to this association a third edition in which most of the inaccuracies have been removed, or at least made of less objectionable prominence.

And had our President not said that he was criticising "*the tables Dr. Hitchcock has presented to us to-day*" he would have much more nearly stated exact truth. For not till the very afternoon when copies were distributed to the members of the association, long after the President's criticism in ink was dried, was a copy outside of the printer's hands, one hundred miles from Boston.

Yes, there are errors in the first, second, and third copies of these tables, and unavoidable, so far as your humble servant is concerned. But because we cannot perfect such a growing subject as Physical Education at once, shall we refuse to shed what little glimmer of light we can to-day, and help others a little ; or shall we compel seekers to wait, till we can fairly dazzle them with our grand enumerations of truth when we think we have given them the complete subject?

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[*] The Secretary has prepared this discussion from MSS. furnished by the gentlemen who took part, with the exception of Dr. Sargent. Pains have been taken to interpolate nothing, though it is possible there may be omissions. The printer's proof sent to Dr. Sargent for correction, has not been returned to the Secretary.

Our most worthy Harvard Professor makes this statement about these tables "*All the measurements tabulated show similar inconsistencies*"! "Credat Judaeus Apella, non ego." If so, is it not natural that a gentleman of the acumen and brilliancy of a Harvard professor would select his strongest case to present to you. This he has done in his elaborate analysis of stature, chest girth, horizontal measure, etc., *five items observed.* But he has failed, or forgot to mention, that in the other *thirty-seven items there was a most decided verification of the law*!

If then we find about twelve per cent. as alleged of imperfection in the first attempt to bring this law to birth, and this error was more than half corrected at a later revision of the data, shall we say the law ought to have a chance to live, or shall we strangle it in its infancy. Shall we not rather say with Dr. Jay W. Seaver of Yale University, "Have a scientific theory as a basis of your work, but be ready to amend it at any time." One word more. If the honored Professor of Harvard University, and President of our Association, will but give us the benefit of his thousands of observations which may be made to bear directly on this point, which he now locks up as valuable secrets in his desk, we certainly shall rest satisfied of the justness or otherwise of his criticisms of these tables. And should he do this, and not find in the main a corroboration of the principle that stature determines the bodily proportions and powers to a very large extent then we will go to our library and burn our books.

Dr. Sargent replied, that his criticism of Dr. Hitchcock's paper was based upon what he believed to be a fact ; namely, that in rushing into print with a small number of items from which to make deductions, errors would creep in, which, while perhaps of service to the compiler in showing him his faults, would surely tend to throw the whole matter of statistics of human proportions into a cloud of doubt, so far as the general reader was concerned. He here again pointed to the early manual of Dr. Hitchcock as an example of error or inaccuracy, tending to mislead.

The speaker then referred to the synoptic chart, showing the averages from 15,000 examinations, presented to the Association by Dr. Hitchcock, Jr., and after expressing a doubt as to whether these were results from 15,000 examinations incorporated in the exhibit, he went on to claim that this chart was made on incorrect mathematical principles; that an average did not portray what was intended, or at least what was desirable to have expressed. If it is best to have something in the shape of a standard for comparison, and he granted the usefulness of such a standard, the mathematical mean was the proper thing. He then showed the difference between the mean and average, and graphically instructed the Association, as to how to compute the mean of a number of items. "Local publishers" and "peddlers of statistics," he said, were doing a great deal of damage to the cause of physical education, by the mistakes they were so prominently making public.

Dr. Gulick inquired if he had correctly understood the speaker of the evening as saying that the fifty per cent. line of his charts was identical with the mean.

Dr. Sargent replied that he had correctly so understood.

Dr. Hitchcock. Jr., presumed that as the expression was used so closely to the criticism his friend Dr. Sargent had made of his chart, that he must be one of the "local publishers" and "peddlers of statistics" referred to. He was grateful for the criticism, for he had learned much in the past from the kindly censure of his friend, and had no objection to being still further a debtor. He plead guilty to being a "local publisher," but objected to the "peddler," since he had never sold nor peddled a single statistical item or chart. But he thought he should still be obstinate, and continue the publishing, doing his best toward determining the measurements of the typical man, until Dr. Sargent would bring out the more perfect standard which he has prepared from data collected since he has been at the Hemenway.

Dr. Sargent said that when the proper time came he should publish his results, but that at present he had no such a standard.

Dr. Hitchcock, Jr., expressed surprise, first, that having no standard himself, his friend should so unqualifiedly denounce as incorrect the work of others, and second, surprise was expressed at the statement of the fact that he had no standard, for he, (Dr. Hitchcock, Jr.) certainly had received what he had, until now, supposed to be authentic, a paper purporting to have been sent out by Dr. Sargent, offering to individuals who would send to him certain of their physical measurements, (accompanied by one dollar), to return to them a chart showing their relations to the typical or normal man.

PHYSICAL TRAINING IN THE PUBLIC SCHOOLS OF CLEVELAND, O.

BY KARL ZAPP.

About three years ago a few members of the Cleveland Board of Education, who had received their first impulse from witnessing exhibitions of the juvenile classes of the German Turners of that city, introduced a resolution which contemplated the introduction of physical exercises to the public schools. After considerable debate the resolution was adopted and physical exercises were made a part of the daily work of the pupils. Being at the time the only man in Cleveland engaged in our work, it was suggested to me to apply for the position of instructor and supervisor of the new undertaking.

I hesitated to accept the position from the consideration that I would be the only man among six hundred and fifty, or, including the high schools, of about seven hundred teachers all ladies, with the exception of about a dozen men in the high schools, and ninety-eight per cent. of them without the least knowledge of systematic physical exercises.

The extension of physical training in this country being one of the chief objects and aims of our organization, the "Turnerbund," I finally accepted the position and formulated a plan of operation. Fortunately I could utilize to some extent the experience which I had gathered when a student in our Normal-Gymnastic Seminary at Milwaukee, at which time gymnastics were practiced in the public schools of that city, under the directorship of one of the most gifted teachers I ever met, Mr. George Brosius, now of New York. I could also call for advice on my colleagues, Carl Betz of Kansas City, and Henry Tudor of Chicago, who had been previously appointed to similar positions in their respective cities.

The manual of Mr. Carl Betz was placed in the hands of the teachers for a guide, and work was begun at once by assembling the instructing corps and giving them a few preliminary remarks upon the subject before us, which was followed by practicing the first lessons of the manual, which treats only of the very simplest movements. These same exercises which are now the work of the little six year old tots when they enter school, were at the start the work of all grades from the highest to the lowest, and curiously it was at that time considered difficult enough by both teachers and pupils. As the proper execution of gymnastic exercises depends to a great extent upon a proper, decisive command, we began at once to let the teachers take turns in giving the orders. These instructions were repeated from building to building, every few weeks, and new exercises were added, until the end of the term, at which time the simple elementary exercises were mastered by the teachers, and more difficult ones were chosen, at least for the higher grades. This method was continued until each of the eight grades had its own grade of work.

My work now consists principally of supervising the work of the teachers and in giving hints on the management of the exercises of the classes, for which purpose I make the round from room to room and often at the same time conduct the exercises.

The method of having the scholars imitate the teacher or some fellow-scholar has been abolished, as it was observed that classes which had been used to this practice did not act so intelligently, nor exercise so energetically, as classes which conceive the *idea* of the exercises demanded and are ready to respond to the word of command. The exercises are carried out in a semi-military style and it is a frequent occurrence to hear the teachers compare their pupils to, or call them, soldiers.

In school-buildings which contain large central halls, so-called *hall drills* are arranged monthly. In these hall drills all the classes of the same grade are assembled and drilled together under the command of one teacher, the others assisting. On such occasions an instrument, piano, organ, violin, or zither is frequently used to accompany the exercises.

In order to give each a chance to excel and show individual ability, after receiving a new exercise, those who are able to repeat the same creditably are given an opportunity. I also frequently allow scholars to either alter a given exercise or demonstrate one of their own invention, which demonstration is not infrequently keenly criticised by the class.

On such occasions as holidays or closing of school, miniature exhibitions in the school-room are participated in by small divisions of from six to twelve children, who go through a series of exercises on the platform of the room.

The general exercises are performed in the aisles between the desks, and are composed of such leg, trunk, shoulder, head and arm motions as are practicable and useful, together with breathing exercises, leaning position and support position for the higher grades, and marching for the little ones.

The results were satisfactory to such a degree that teachers of neighboring towns and cities came in great numbers to see the work in gymnastics, and after returning home introduced the same into their own schools. Many of our teachers produce as exact, precise and energetic work as if they had been engaged in it ever since they began teaching ; but as I stated before, not having had any previous training they could not be left to themselves, and on the contrary have to be guided carefully. I lay out for them the lesson for each week of the school term, which would not be necessary if they had received a thorough training or if we had a number of special teachers of physical training.

As we dare not think of making any records or measurements, and as the time allowed for physical exercises is so insignificant, we must content ourselves with the following results of our effort : An improved carriage of body in sitting, standing and walking, a decrease of round and stooped shoulders, a marked improvement in discipline, and greater ease in governing the pupils.

In the high schools we have advanced a little beyond the mere free body movements, and as soon as a proposed annex to one of the buildings is completed we shall have gymnasia fitted up for boys and girls.

So far we practice in the centre hall of one building, exercises with iron dumb-bells, running, and a few autoganistic games, also a few tactics with the boys, while the girls practice marching, fancy steps, exercises with wooden dumb-bells and Indian clubs. As soon as our gymnasium rooms are fitted up, regular gymnasium work, after the German system, will be introduced.

In our normal school the exercises are also part of the study, and every graduate is capacitated to instruct in this branch.

About a year ago I proposed to the Board of Education the introduction of gymnastic games and popular sports into the higher or grammar grades, to be practiced during the favorable season in the school yards. I considered standing and runninghigh and broad jump, hop, step and jump, marching, running, simple tactic exercises, bar and pole vaulting, climbing of poles and ropes, throwing of shot, using adjustable dumb-bell, etc., as suitable exerceses, while hopping and running games and races, tug of war, etc., might with advantage be introduced for healthy out-of-door recreation. But the proposition failed of accomplishing its purpose on account of lack of funds.

Mere calisthenics or free exercises must be considered as the very rudiments of physical education in our public schools, and the introduction of more substantial work as the connection of well-equipped gymnasium with every school building, as well as the engaging of special teachers to govern the same, must be the ideal to be realized in the future. That such demands are in no wise unreasonable is exemplified by the fact, that countries with financial resources far inferior to those of this country, such as Switzerland, Germany, Sweden, Denmark, France, and Italy, have long since put the same in practical operation.

PHYSICAL EDUCATION.

A New Profession.

BY LUTHER GULICK, M. D.

There seems to be a very general misapprehension, even among intelligent men, as to the nature of the work in which we are engaged. By many it is regarded simply as a specialty in medicine; others think it merely a department in athletics; others still, with more gross ideas, regard us as men who devote our time and energy to the building up of muscular tissue.

Perhaps I can best define the profession by stating its objects. It is difficult to formulate any classification that is at once logical and complete. The following, therefore, is presented, not without feelings of diffidence, as in some respects at least, it differs from any that have been hitherto presented.

I will make three grand divisions of exercises, according to their purpose: namely, Educative, Curative and Recreative gymnastics. Hard and fast lines cannot be drawn, assigning each exercise to a particular one of these classes, as frequently it will be found that one exercise belongs to two or more classes at once, as in medicine, opium is a hypnotic, cardiac stimulant, antispasmodic, cerebral stimulant, anodyne, etc., etc. This is a division of the objects of exercise, and not of exercises themselves. I will now take up the divisions somewhat in detail.

1. *Educative Exercises*, or Physical Education. We adopt the following definition for the object of educative exercises: "To lead out and train the physical powers; to prepare and fit the body for any calling or business, or for activity and usefulness in life." This may be divided as follows:

(*a*) *Muscular Strength.* This includes strength of the heart and respiratory muscles, as well as the arms, legs and body.

(*b*) *Endurance*, a matter of the heart, lungs and nervous system as well as of the extrinsic muscles.

(*c*) *Agility* or quickness of action, being largely an affair of the central nervous system.

(*d*) *Muscular Control.* Excellence in almost any art or trade involves accurate control or discipline of certain parts of the body. In playing the violin, a great deal is demanded in this direction; first as to the coördination of the fingers of the left hand, being able to place them rapidly, independently, and with absolute precision, both as to time and locality, upon the finger board of the violin, in a position that is naturally awkward; second, to be able to use the right and left arms with entire independence, the muscles of the wrist being used principally in one case, and of the fingers in the other. In piano playing there is similar training. The hands have to learn to work independently, and even the fingers independently of each other. They have to learn to act with extreme rapidity, with absolute certainty, with automatic regularity. And so on with all the musical instruments, there is a large amount of work to be done which is primarily, fundamentally, and essentially, Physical Training.

In the trades there is a similar state of affairs. Perfect control is fundamental and is usually secured only by years of practice on the thing to be done. Thus filling a flat surface is an extremely difficult thing, not because it is difficult of comprehension, but because it is difficult of execution. The movement is perfectly simple, placing the file on the surface to be filed, observing that the surface of the file exactly coincides with the surface to be filed, with one hand on each end of the file, a certain desired pressure is brought to bear, traction being made at the same time with both hands. As the file moves over the surface there is a constant variation of the position of the fulcrum, the two arms of the lever are thus constantly altering in length ; the forces required at each end to produce a uniform pressure on the surface to be filed is one which is thus constantly changing, and which must be met by the varying strength of the muscles which do the work.

Here again we see Physical Training.

There are numerous departments in the trades, the arts, and daily life, where the excellence of work depends largely upon physical training in some branch. To-day these are manned by specialists,—specialists, not in Physical Training, but in the end for which the training exists. To make my meaning plainer, let me refer to the violin player again. The music teacher teaches the violin, and gives finger exercises, and a large portion of the time of the music teacher is spent, not in teaching music, but in physical training. Now, the music teacher, unless exceptionally qualified, as music teachers are not ordinarily in this direction, is not as competent in physical training as a man of equal abilities would be who gave his whole time to the subject. Thus the physical training part of learning to play the violin or piano could be better done by a man who made a specialty of physical training than by a man who was primarily a very fine musician, and who took up this physical training as an incidental matter. Flexibility of the wrist, perfect control and coördination of the muscles, independent action of the hands, action and quickness of the fingers, can all be gained better by other means than by mere finger exercises on the violin or piano ; but in general it is not the teacher of music who is best qualified to take up this work, for the questions are primarily those of physiology rather than of music. Let each do what he can do best, physical trainer, physical training, music teacher, music and not physical training.

(*e*) *Physical Judgment.* This may be called a correlative of muscular control, this the intelligence telling when and where. "It is a sort of psychic trigonometry by which the trained mind calculates the distance, position and motion of objects." None of the important points already considered can take the place of this, nor can we get along without it. A man wishes to jump a ditch ; he has no time to measure it and calculate how much muscular effort will be required to clear it, but physical judgment enables him to do all this at once. There seems to be confusion as to the difference between muscular control and physical judgment. Take a catcher behind a base ball bat ; physical judgment tells him where to put his hands, and the exact instant that the ball will reach them ; muscular control enables him to put his hand where he chooses. One might be able to put his hands where he chose, but not know where ; or he might know where without being able to place his hands there.

(*f*) *Self Control.* This may be described as the power of the mind over itself. It is the power which gives self-possession, allowing a man to act naturally in times of excitement and danger.

(*g*) *Physical Courage*, that which renders a person willing to undertake, that quality which comes to one naturally, from a knowledge of his ability, gained through experience. "There is sometimes a constitutional timidity, or lack of what we may call physical faith, that has to be overcome." A presumptuous daring is not physical courage, being born usually of ignorance of the real dangers rather than a calm meeting of them.

(*h*) *Symmetry*, harmonious, or all round development of the body. The strength of a chain is represented by the weakest link, and this is not untrue of the body.

(*i*) *Grace*, which is fundamentally economy of action. It differs from muscular strength and from muscular control. A man may have both these and not be graceful. Comparing grace and symmetry, grace is beauty of action, while symmetry is beauty of form.

(*j*) *Expression.* In this country we do not know very much about these special exercises. The Delsarte gymnastics, perhaps, are the best example of this type, their aim being primarily to enable the body to express the thoughts, ideas, emotions of the mind in the most intelligible way to other minds through their eyes and ears, thus including much of gesture, elocution, etc.

2. We now come to the second division, *Curative Exercises.* It is not designed to trench upon the field of the medical profession ; but it is well known that some disturbances of the system can be cured, and many prevented, by the correct use of exercise. The

same is true in relation to some bodily deformities. Certain cardiac, spinal and nervous diseases and disorders of the nutritive system are peculiarly susceptible to gymnastic treatment. I will not speak further of this branch, as its importance is already coming to be understood.

3. *Recreative Exercises.* There is a real and fundamental difference between recreative or play exercises and educative gymnastics. It consists primarily in the attitude of the will, and it matters little so far as this is concerned whether it has to exercise itself in confining the mind to a difficult task in arithmetic, or to keeping a fixed and sustained attention on the leader of a calisthenic drill. To illustrate,—you will all recognize the picture in some form or other,—a class of young ladies, students, are to take exercise, they are already taxed mentally to their utmost. This is the argument for their exercise. Calisthenics are prescribed. Then one of two things will follow, either they memorize a series of exercises, so many movements, so many counts to each movement, and subsequently do these exercises together, or they follow a leader by work of command. In each of these there is more required of the nervous system than of the muscular system. From twelve to twenty-four different movements are done, from fourteen to sixteen counts on each movement, each one being required to remember the movement that comes next, etc. The amount of muscular work demanded is trifling, the degree of attention required is large. In the other case where a leader is followed, but no set of movements has to be committed, at the word "attention" every eye is fixed on the leader, and at the word of command each one does the exercise with all the precision possible, both as to time and movement.

In both these classes of exercises the will, the attention, must be controlled. They may be educative, but they are not recreative. If brain centers need recreation, it is a radical and fundamental mistake to give gymnastics that shall call upon those same centers. If school children need gymnastics that shall further tax their wills, and thus the nervous system, then by all means let us give them these exercises, but if not let us prescribe exercises which shall take and secure more muscular strength and have less nervous drain. I am not criticising all calisthenic drills for school children, only those which demand attention and will, when recreation is needed. Automatic movements are not included in this class. The mere fact that a lesson is interesting is no proof that it is not exhausting ; the same is true of exercise.

I wish next to speak of the opportunities that are offered for scientific work in this profession. It is hardly possible at the present day for a man to look forward to adding materially to the sum total of knowledge in any of the older professions. A man who goes into physical education with fair abilities and preparation expects in the course of a few years to have acquired all that has been known up to his time (the scientific side of the subject is as yet young) and to add materially to the sum total of knowledge on this subject. In this respect, then, does this profession differ from others, in that it is new, and every man may expect to do that scientific work which will be not merely original with him, but original to the world. In fact, each man will have to depend to a considerable extent on the results of his own investigations, for he has not as in medicine, reliable and elaborate treatises on which to rely. The science is as yet too young to have developed them. He must expect to assist in the development of such works for the use of those who come afterward. An oak tree during the first year of its existence is susceptible to slight influences which would be entirely unfelt a few years later, even if multiplied a thousandfold. This profession has still to be defined, it has not yet crystallized, and thus it is possible to stamp it with one's own character as it will never be possible again. What physician in the world could now alter the practice of medicine? And yet the time was when medicine was in the same plastic state that physical education is in to-day. Men of foresight will see in this fact the possibility of a permanent influence not offered in the professions that are already formed.

It would be out of place here to attempt to discuss the nature of the various scientific problems which are presented in this field. They vary from the study of the exact effects on the heart of long and short distance running, the consideration of the relative effects of complicated movements on the brain and nerve centers, the relation between different kinds of muscular work and the intellectual activities, to the study of the laws of heredity, the relation which the rapidity of blood-flow bears to the psychical activities, and so on and so forth. The problems are without number, and are multiplying every day. Every problem which is solved in this field seems to bring to view ten, which are of more vital importance, of more difficulty and more interest than the one before them. There are few scientific fields to-day which offer opportunities for the study of problems of greater value to the human race, or more fundamental in regard to its ultimate success, than does that of physical education. It is a factor in modern life, that is as yet unappreciated. It deals with life on a broad side, is in line with the most thorough modern physiological psychology in its appreciation of the intimate relations of body and mind, is in line with our modern conception of evolution, as it works to develop a superior race. This profession offers to its students a large and broad field for intellectual activity, involving for its fullest appreciation a profound knowledge of man through psychology, anatomy, physiology, history and philosophy. To sum up this part of the argument, I would say that physical education offers a greater field for original work than almost any other. Second, on account of its youth and plasticity it offers, the possibility of a permanent influence that is never offered except in the youth of such professions. Third, this work is intrinsically of great value. Fourth, it offers a great field for intellectual activity.

This profession, then, differs from any that now exists. It is readily seen that it is not merely a department of medicine, which relates primarily to the prevention and cure of disease. The mere fact that a man is an excellent medical practitioner will not qualify him to take hold of educative gymnastics, although it would qualify him to understand curative gymnastics. On the other hand, the study of psychology and pedagogy will not qualify a man to take hold of curative gymnastics, although it might qualify him to understand educative exercises.

I take it that there is no other factor which is as prominent in the development of any profession as the kind of men who take upon themselves the functions of that profession. The advance of physical education will depend more upon the kind of men who take up this work as their profession, than upon any other one factor. If it is largely taken up by men of little education and small abilities, the work will never become of the greatest value, nor will it be favorably known to the general public. If however, on the contrary, men of collegiate training, philosophic minds, of broad purposes and earnest hearts, are induced to enter this field, the profession will show that it is intrinsically a broad, scientific, philosophic field, and it will be recognized by thinking men as one of the departments in education, fundamental in the upbuilding of the nation.

I have endeavored in this paper to show : *First*, that this is a profession, and in the rough to define its aims. *Second*, to show that opportunities for valuable work are abundant. *Third*, that great importance is to be attached to the kind of men who enter this profession.

LATERAL CURVATURE.

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This deformity is of interest not only to the physician but also to all who make physical culture their study, for lateral curvature in all probability results from a disregard of those principles of physical culture which students of that branch should be active in upholding. It is in no sense a disease, properly speaking. It is a deformity of growth and although its treatment belongs to the department of surgery its prevention is essentially a function of all students of physical culture. Lateral Curvature, or Rotary Lateral Curvature or Scoliosis, consists as is well known of both a deviation of the spinal column to one side and also of a twist. The latter is of great importance and is more difficult to correct than the simple deviation to the side. The torsion necessarily results in any considerable lateral bending of the spine from the anatomical structure of the individual vertebrae. This fact has been abundantly demonstrated but as it is of purely anatomical interest a description will not be presented here. Other facts which it is well to bear in mind are the following, viz. : the deformity is much more common in girls than in boys ; it is an affection of early childhood which is brought to the attention of the physician usually about the time of puberty. The cause of the greater frequency in girls than in boys is probably the more rapid growth of girls and their less active habits. The affection is one of childhood as it is only in childhood and puberty that the chief growth of the bones takes place.

No consideration of the treatment of lateral curvature is satisfactory without some investigation of the theories of the causation of this deformity. Much has been written on this subjec and many different theories have been advanced and although the subject is still one under discussion it may be briefly stated that the weight of argument is decidedly in favor of the belief that lateral curvature is the result of super-incumbent weight falling obliquely upon a weakened spinal column.

It is hardly necessary here to go into the details of the arguments to support this theory. It may be said however that this view is substantiated by the fact that the deformity does not occur in quadrupeds, where there is no super-incumbent weight and that it is known to result from such attitudes as would cause super-incumbent weight to habitually fall incorrectly upon the spinal column. If the human figure be inspected when seated or standing, or during movement, or at rest, it will be seen that the spinal column is rarely held perfectly straight. The deviation of the head to one side, the rising of one shoulder, the resting of the weight more on one hip than on the other, holding one foot in advance of the other, sitting on one buttock more than on the other, leaning to one side ; all these positions necessarily throw the spinal column out of line. If the bones of the spinal column are less than normally strong and these faulty attitudes are assumed habitually or frequently the super-incumbent weight of the upper part of the trunk or head will cause the bones forming the spinal column to grow irregularly. This develops lateral curvature. The cause of the unnatural softness of the bones of the spinal column is not far to seek. An analogous condition is found elsewhere in the body under the well-known affection of rickets, which usually attacks the lower extremities and which in certain instances affects one leg more than another or one part of the leg. In certain cases only the spinal column is affected owing to conditions which are not yet fully understood.

It is frequently stated that the lateral curvature results simply from the fact that the muscles of one side of the body are stronger or weaker than those of the other and the treatment of lateral curvature necessarily consists in the strengthening of the muscles of one side of the body so that the equality of muscular power may be established. This, however, is only partly true. The analogue of lateral curvature is the deformity known as knock-knee, which has previously been regarded as due to the spasmodic action of certain muscles, but which is now known to be due to the faulty growth of the bones due to the super-incumbent weight falling irregularly upon the knee-joint. Any cause which will favor the frequent assumption of what may be called faulty attitude, favors the development of lateral curvature in persons of a weakened spinal column. Occupation and habit are frequent causes, as is also inequality of length of legs. The muscular weakness of certain groups of muscles on one side of the body are also among the factors producing this deformity, though the latter does not present by any means the most common cause.

Before commencing treatment of lateral curvature it is always well to bear in mind that the natural course of the deformity not only varies in different cases but that there are well marked stages of development. These stages are not sharply defined, but looking at a large number of cases it is easy to group them under the following heads: Those in the Initial or Flexible Stage; those in the Formative Stage; those in the Stage of Arrest.

In the Initial Stage no change in the shape of the bones has been developed. In the Formative stage some change in the shape of the bone has taken place and further change is in process of development.

In the Stage of Arrest, we find all osseous change that is likely to occur, and no more may be anticipated under ordinary conditions of health.

No precise period of development or age limit can be set for these different stages. They vary as individuals vary in growth, but it may be stated in general that the first stage occurs in young children, that the second stage is more frequently observed about the time of puberty, and that the third stage cannot be said to be established till the period of growth has been well passed and the bones have assumed their normal strength. Bearing in mind these facts, it is evident that before treating any individual cases it will be necessary to thoroughly examine not only the condition of the deformity but also its stage, and furthermore to consider the habits, occupation and muscular strength of the individual to be treated, and in estimating the muscular strength it is necessary not to consider the general muscular strength but simply the strength of those groups of muscles that are needed to hold the trunk erect and prevent the deviation to the side, the dropping of the shoulder, or the throwing of the weight on one limb more than on the other. The examination of the patient should be thorough.

The most ready means for determining the muscular strength has been devised by Dr. Chas. Scudder of Boston, and will be shown later.

The determination of the stage of the affection is made by an examination of the patient's back which readily shows whether or not the curvature disappears when the patient lies upon the face or is suspended by the neck. In other words whether the curve is a flexible or a resistant one. Alteration in the shape of the bones can be determined by inspection of the patient's back when stooping. If alteration in the shape of the bones has taken place there will be a rotation and a projection of the ribs to one side of the back and a depression of the ribs on the other side as can easily be seen if the arched back is looked at from behind forwards. That the curvature is in danger of increasing is to be determined by the patient's age or rate of growth, the relation of weight to height as seen by Bowditch's tables and by the inherited tendency to growth, as ascertained from family history. After a thorough examination of this sort the question of treatment of the invidual case presents itself and here we are met with a variety of conflicting methods of treatment.

These methods may be grouped as follows: Methods of complete recumbency; Gymastic method; Method by drill; Method of mechanical appliances, including plaster jackets.

That a variety of methods have been advocated so strenuously sufficiently indicates that any exclusive method is irrational, and that the cases should be treated in accordance with their individual indications and not in the spirit of routine system.

If it is irrational to encase the trunk of a feeble child in a plaster corset which necessarily weakens still more the muscles holding the trunk erect, it is equally irrational to rely on muscular exercises in the expectation of curing rotation in the form of osseous scoliosis.

It must be clearly borne in mind that this affection, like all others, has different stages, and that the treatment in the different stages varies according to the stage. In lateral curvature, as has been seen, the different stages cannot be sharply defined, and the gradations are often not easily distinguished. In the same way the rules of treatment are not absolute, and those of one stage may be in part applicable to those of another, but for the purposes of study it is well to clearly distinguish the objects of treatment aimed at. The deformity of knock-knee is treated in the formative period in a different way from what it is in the secondary period, or in the third period.

In the formative period, where there is no change in the bone, but simply a faulty position of the limb, due to muscular weakness or imperfect attitude, one method of treatment is used. In the second period, where there is already some distortion of the bone, and also a soft condition of the bone, the use of appliances is advisable. In the third period, after the bone has become hard and the distortion is marked, appliances are of little use. Manifestly it would be useless in the third period to rely upon gymnastics for the correction of deformity. It will also often be advisable in the second period to have recourse to appliances, and not rely solely on gymnastics. In the same way it may be said that the surgeon who would rely upon the gymnastic treatment of lateral curvature throughout all the stages, could hardly be called thorough in his methods, for while the strengthening of muscles is the chief and important aim in the formative stage of lateral curvature, in the last stage it is almost useless and in the second stage it is often not sufficient.

It is important that this should be clearly borne in mind, for the fact is not generally known, even by physicians, and as an illustration of this a case can be cited, where a growing boy of fifteen, with a rhachitic curve in the back was distinctly advised that a few months' work in the gymnasium would cure his deformity, although there was marked boney change in the shoulders, spine and ribs which was rapidly increasing.

The object to be aimed at in treating lateral curvature is: *First*, to correct all faulty positions and attitudes. *Second*, to arrest the growth of the curve. *Third*, if possible to diminish the curve.

In the initial stage, where there is no change of bone and where the curves are not habitual, the patient should be daily exercised in assuming correct attitudes. The patient should be set up by drill in the same way that a raw recruit is obliged to assume a proper position of carriage. This, as is well known, can be done in a variety of ways. It can not be done in the ordinary class work of gymnasia, as in daily exercises especially directed. It will always be facilitated by the strengthening of such muscles as are needed to hold the proper position if they be found weakened. Simple general gymnastic exercises will not of themselves be sufficient, and in patients who are unusually weak it is advisable that only special drill or special exercises be used until the deformity is corrected, rather than that the patient's strength should be expended on general exercises which may fatigue him.

In the treatment of the first stage, it is necessary to know whether the curvature resulted purely from habit or occupation or from muscular weakness. This can be determined first by investigation as the child's attitude in sitting, standing, the child's hours of study, and also by the fact that the strength of the muscles holding the trunk erect. Where the muscular system seems to be normally strong it may be inferred that the curvature is due to habit of attitude or from occupation, as that of the school girl required to sit for more or less long periods. Where muscular weakness exists, muscular exercises are desirable. The nature of these exercises it is hardly necessary for me to describe here in detail.

Whether these exercises should be of the class known as the Swedish movement, whether they should be with or without apparatus is a matter to be determined by the circumstances of the case. One thing, however, is evident. The gymnastics should be prescribed for each individual case, and class gymnastics are not desirable, for as the curves vary, exercises useful for one individual will not necessarily be of advantage for another. The exercise for each case, therefore, will require to be selected after a careful investigation of the nature of the curve in each case.

Where gymnasia are accessible exercises can be carried out more regularly and with greater zest than is usually possible at home, but as the exercises are to be carried out daily for a long period, home gymnastics must necessarily form an important feature in the treatment. It is impossible to formulate any rules to guide the selection of gymnastics for these cases, yet it may be said that the system adopted by Mr. Bernard Roth, of London, may be mentioned as being generally of practical value. In this country, Roth's exercises have been adopted and modified by Dr. Reginald Sayre, and used by many surgeons. They consist of an adaptation of the so-called Swedish movement system. The exercises should be done directly under the eye of a surgeon, nurse or director, or some responsible person.

Mr. Roth's exercises may be said to embody this principle. The patient is made to stand in as nearly a straight position as possible and he is to be obliged to walk, to bend, to stoop and carry out certain movements, keeping the spinal column in this corrected attitude. A number of exercises should be carried out with the patient lying upon the face, the spinal column is then as near straight as possible, the super-incumbent weight having been removed. These exercises should be carried out daily, first under the direction of the person having charge of the case and afterwards under the eye of the mother or nurse. They need not interfere with the work in gymnasia, but they should be carried out daily withont interruption. The amount of time to be devoted to these exercises differs with the strength of the patient. Roth's system may be regarded as a combination of the setting up drill of raw recruits and the so-called Swedish system, as improved by Eulenburg.

Any method of gymnastic treatment can necessarily occupy but a small portion of the twenty-four hours, and it is manifest that if during the unemployed portion of the time the patient assumes habitually faulty attitudes, improvement must necessarily be imperfect. It is necessary, therefore, that a careful study be made of the patient's habitual attitudes, and the chairs used by the patient should be carefully investigated. The patient should not be allowed to sit for more than fifteen minutes in one chair unless it is suitably constructed to fit the figure, giving proper support to the back and making faulty attitudes less comfortable than the normal ones for sitting. Where reading is done it should be done in a proper reclining chair. The construction of such a chair is a matter requiring some thought. It may be here stated that no chair is useful in cases of curvature, where the patient's back from the sacrum to the shoulders does not rest well upon the back of the chair. The depth of the chair should not be greater than the distance from the hollow of the knee to the sacrum. The chair should not be so wide as to allow tipping to one side. The back of the chair should slope backwards slightly. Low arms to the chair and a narrow seat make leaning to one side or the other uncomfortable.

TREATMENT OF LATERAL CURVATURE IN THE SECOND STAGE.

In treating lateral curvature of the second stage, the measures to be used are similar to those in the first stage with important additions. The patient should be taught to assume as erect a position as possible, and should exercise with the trunk in this corrected position. Faulty attitudes in sitting, standing or writing should be avoided, but more than this should be attempted, for no amount of exercise can correct a shortened ligament, and no muscular force can correct tortion. The means that are specially to be relied on are such as will increase the flexibility of the spinal column. If the patient stoop directly forward it will be found that the rotation is much more evident. If the patient bends backward so that the back is strongly arched backwards the rotation will in a measure disappear, the amount of diminution will depend upon the amount of bony change. The methods to be used for increasing the flexibility of the spine necessarily vary. They may be characterized as those similar in principle to what are used in training backward contortionists, who, as is well known, acquire an unusual amount of flexibility in the forward and backward movement of the spinal column, and also in all probability more than usual flexibility of the whole of the spinal column. The amount to be gained in this way in increasing the suppleness of the spinal column will vary in individual cases.

In many instances it will be found that in increasing the backward flexibillty of the spine the amount of rotation is diminished. After all that can be gained in this way is reached, the condition of the patient has been reduced to nearly that of a flexible curve, and should be treated accordingly with this exception, that it is of greater importance to prevent faulty attitudes, and for this, fixed appliances are sometimes needed. The most efficacious of all fixed appliances is the plaster jacket, which to be thoroughly efficacious should not be removable. This should be applied to the patient in as corrected a position as is possible, in fact, in an over-corrected position, where that can be done. Such plaster jackets prevent faulty attitudes, and serve to break up the habit of leaning to one side or sitting to one side, but it should be always borne in mind that any stiff appliance, especially a corset, weakens the muscles of the trunk, and it should be worn as short a time as possible. No specified rules can be laid down as to the length of time that they will be needed. After plaster corsets are removed, lighter appliances can be used as a reminder of the need of proper attitudes, or all appliances may be discontinued, rules being laid down chiefly on proper chairs, proper desks and exercises. To what extent gymnastic exercises should be used will depend upon the amount of muscular weakness. Exercises to increase or maintain the flexibility of the trunk should be continued daily by the patient during the period of the danger of the increase of the curve.

Book rests should be furnished to hold the book when the patient is reading. Where suitable reclining chairs cannot be provided the patient should not be allowed to sit for more than fifteen minutes without changing his position or walking about. Where patients are manifestly weak, recumbency in the middle of the day is desirable. Under these circumstance the patient should lie on his back on as hard a surface as possible. The amount of time during which the patient should be kept recumbent varies in individual cases. In some instances some mechanical appliances constructed for the purpose of retaining the patients in a proper position when recumbent can be used to advantage. The nature of these appliances is a matter chiefly of surgical interest. Medical remedies may be required in certain instances as tonics, as a rule however much medication is not necessary in ordinary lateral curvature.

TREATMENT OF THE THIRD STAGE.

In a perfectly healthy subject the third stage requires no treatment. The curvature is established and further increase is arrested. It is impossible that the curve should be corrected by any method of treatment as change in the shape of the bone has taken place. Although this statement is true in general yet there are certain exceptions. If the patient's health has become undermined, the distortion may cause much discomfort and pain from the abnormal strain upon certain ligaments or the pressure upon the spinal nerves. In these cases some treatment is desirable to relieve suffering. Suspension and the application of stiff corsets have been found to be of benefit. Massage and electricity and in the stronger patients general gymnastics will be found of relief.

In conclusion it may be said that the treatment of lateral curvature was until the early part of the century almost exclusively mechanical and was not satisfactory. A method of treatment largely gymnastic followed and though of use in the lighter case was unsatisfactory in cases with marked osseous change. It is to a proper combination of both methods in suitable case that we must look for rational treatment of this class of distortions.

THE ADVANCEMENT OF PHYSICAL CULTURE IN THE SOUTH.

BY E. MARGUERITE LINDLEY.

Physical Culture was introduced into the South through the Defuniack Chautauqua, Florida, in February, 1888, by Dr. Wm. G. Anderson, of Brooklyn, and the work was conducted that season by Miss Kate Anderson. The summer of that year, Dr. Anderson arranged the department for the Piedmont Chautauqua, Lithia Springs, about twenty miles from Atlanta, and sent me there as director. In Feb. of '89, he sent Miss Grace Prentiss, of the Brooklyn Normal School, to the Defuniack Assembly, and in March of the same year, he personally conducted the work at the Albany, Ga., Chautauqua. During the summer of '89 I was again at the Piedmont Chautauqua. The work was not represented at the Defuniack in Feb. of this year, but Dr. Anderson again conducted the department at Albany, in March. The work conducted by these others will of course be reported by them. I only speak of that (directly and indirectly) under my supervision.

At the Piedmont Chautauqua I was associated with the leading people of different Southern cities all of whom were anxious to talk on the science of physical culture, and none of whom previous to my visit supposed it included any thing beyond school calisthenics. This enterprise was one of Henry Grady's. I also had a normal class conducting the work theoretically as far as possible in the short time. General surprise was manifested at the results of such systematic exercise, even though the days were hot. The people were as much interested in their growth of muscle, improved respiratory ability, and increased appetite, as a class of boys would have been. Novelty, was of course an incentive to many, but the novelty of freedom from back-aches, led the sensible thinkers to request my remaining in the South and establishing a permanent work. Macon was the first city to request this, and then came others, Atlanta the most emphatic. Could I then have reached twenty capable teachers, I would have felt ready to establish them in Southern cities. Experience in the work financially, has made me more cautious. My locating in Atlanta was at the request of Henry Grady, and Drs. Westmoreland and Alexander, who went diligently about advocating the profession. Other physicians offered their aid in lectures as well as in influence, and we began a free Normal Class for the teachers of the schools. It is no discredit to the work, or to those so ready to aid it, that the scheme failed, the teachers mentioned wanting only "pretty exercises," for their classes, regardless of health or beauty of figure, consequently the lecture room was early deserted. One plucky little scion remained who begged to be allowed to study with me (she had been obliged to give up mental teaching on account of ill health). *This* was the germ of the Atlanta Normal School for Physical Education, which last year graduated three good teachers. The young lady mentioned, is Miss Bessie Wright, a graduate of the Cook Co. Ill. Normal school. At present she is teaching in Pittsburg and Allegheny City, Penn.

When these three young ladies mentioned expressed a desire to make as thorough a study as possible of Physical Culture, the physicians offered to redouble their aid, and accordingly eight of them, and four other teachers formed themselves into a Faculty, having stated hours and days for their lectures, which were conducted with as much pride and interest as though the class had numbered thirty instead of three, and were ready this year to renew their work for us. Our Faculty is as follows, and comprises, with our Advisory Board, the leading physicians of Atlanta: F. O. Stockton, M.D., President, and Lecturer on Physiology and Hygiene; Willis Westmoreland, Jr., M.D., Lecturer on Deformities; William Perrin Nicolson, M.D., Lecturer on Anatomy; F. W. McRae, M.D., Lecturer on Emergencies and First Aid; A. G. Woodward, M.D., Lecturer on Appliances in Plaster of Paris; S. Mary Hicks, M.D., Lecturer on Anat. Phys. and Hygiene of Pelvic Organs; B. W. Bizzell, M.D., Lecturer on Histological Anatomy; E. Marguerite Lindley, Instructor in Health Culture, Anthropometry, Theory and Exercise; J. G. Armstrong, Instructor in use of voice; Sumner Salter, Instructor in Music in Gymnastics; Capt. Calhoun, Instructor in Manual of Arms; Maj. W. L. Slaton, Supt. Public School of Atlanta.

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Eight young ladies will graduate this season. The school authorities are now seeing the injury of indiscriminate calisthenics, and also that a teacher to conduct the work must have no other cares. I could obtain positions for our teachers if they were permitted to teach botany, astronomy, book-keeping, mathematics, etc. This I have refused from principle, and the graduates from our school this year are to take small salaries with the privilege of using the gymnasium for private classes.

There is much quackery through the south in the profession. I have through the press, as well as in my talks denounced the teacher of calisthenics, for presuming to call her work physical culture. The teachers in the northern cities have no idea how much courage it requires to continue pioneer work, and only for genialty and regard of my southern friends and the good results ever growing under the work, I should have gone to other locations last fall. This enterprise has been self-supporting, as are all the branch schools, with a good lookout for another year. The ladies and girls in the south are delicate, partly from climatic influence, and partly from the inheritance of a too quiet mode of life. In the six hundred whose measurements I have taken, I have found but ten of good build, and no one free from some of the common physical defects, headaches, back aches, nervousness, and continual fatigue heading the list with ladies. The proportion of spinal defects is four of every five, the majority being left lateral from the middle dorsal to the sacral, right hip high and shoulder low, presumably from too much horseback riding. Pelvic disorders are also very prevalent, and it seems an interminable task to get corsets off these "victims."

It is hard to convince the mothers that deformity *exists* in their daughters. In such cases, I have the examination given in the presence of their family physician. Even then it is almost impossible to induce them to take the children out of school. "I can't afford to lose her time from music or her school" is the argument; the fact of mental economy in this, is the hardest of all to impress upon them. Mental economy is, now I have shown them clearly the injury of school calisthenics indiscrimately given, the hardest argument I have to advance. Economy of time and health, to mothers, and mental education and strength (through massage and passive gymnastics), to the invalid. The school authorities are beginning to see the mistake of mental *incubating*, and are taking measures to substitute for it mental *educating*, by the introduction of physical culture. It is not unlikely that the Atlanta public schools will adopt it another year. At present they have an iron-clad system of calisthenics, which in the girls' High School has advanced into dumb-bell, hand and club work, taken regardless of figure, dress or health, and in hot, unventilated rooms. Probably not one of the girls is dressed to use her arms over her head ; luckily but little time each day is allowed for the work.

Beside the informal talks, I give in the Atlanta school, a number of lectures ; thus far these audiences have been in Chattanooga, Savannah, and Milledgeville, where classes have since been formed. Beside visiting these cities again, I have also arranged to give talks in Lafrange, Athens, Rome, Macon, Augusta and Montgomery. The interest has grown and is growing, *not* from the science being a novelty and a fashionable move, but from the advantage every patron of the school has received—the legacy of good health that comes to all, a legacy more rare and necessary than in those colder sections of our country, where physique is more uniformly of good standard.

You can see what interest the Atlanta class feel, by knowing that my expenses here are covered by subscription. They want the Association to keep us by the hand, to aid us in every advanced idea, and to feel that Atlanta's pulse beats as high in the need of health reform, as though hundreds of miles did not separate us from the radiating points of the science.

At Milledgeville, Drs. Powell and McDaniels, of the State Lunatic Asylum, were most emphatic and cordial in their praise of the work ; they were already alive to the necessity of having it introduced into their institution, particularly into their ward for dullards—for Georgia sends such to her insane asylum. I have one of these in my Atlanta school, who under daily massage and exercise is showing wonderful improvement, the detail of which I will not now recount. The methods, or system of work, employed in our school are adapted to individual needs. The school started as one of *health culture*, not as a play room, and will never deteriorate from health culture. No lady or child is allowed any exercise until her measurements have been taken, heart, lungs, spine, and pelvic organs tested. Where difficulty of any serious nature exists, the patient's physician is consulted and the plan of exercise, etc., subjected to his approval, his suggestions obtained. This is prompted both by necessity and preference. Necessity, as isolated as I am from other schools of physical culture, I need the approval of local physicians, to guard me from adverse criticism, in case any were necessary. Preference, as it saves me the worriment that would naturally attend responsibility. Only the best of results have followed the work, as a result of this caution.

Each patron of the school is instructed in the matter of dress, diet, baths, habits, exercise, etc., to suit the individual needs, and progression is carefully conducted. Restrictions in class work are also very carefully observed. Great care is bestowed on breathing exercises, also on vocal culture, both for the sake of euphony, and of economy in lung and throat power. At stated intervals during exercise hours, rest is made *imperative*. *Absolute* rest taken recumbently, which is accompanied by as much relaxation of the mind as can be enforced among so lively a set of ladies. Games, heavy work, etc., music even without Swedish movements, keep us ever cheerful and happy.

A. A. A. P. E.

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Charles McIntire, Jr., M.D., 104 N. 4th St., Easton, Pa.
Melville A. Marsh, Rochester, N. H.
F. W. Meyer, Y. M. C. A., Springfield, Mass.
Gen'l E. L. Molineux, Brooklyn, N. Y.
Z. W. Monroe, M.D., Monroe, Wis.
Oliver C. Morse, 219 Florida St., Springfield, Mass.
L. R. Montgomerie, Y. M. C. A. Training Sch'l, Springfield, Mass.
F. F. Murdock, Bridgewater, Mass.
Wm. Perrin Niccolson, M.D., Traders' Bank Building, Atlanta, Ga.
Wm. E. Ninde, Y. M. C. A. Training School, Springfield, Mass.
Eleanor Parry, Rome, N. Y.
Fred'k Partington, A.M., Staten Island Acad., Stapleton, S. I., N.Y.
C. Q Payne, Stamford, Conn.
Charles Paxson, 112 Custom House Place, Philadelphia, Pa.
A. C. Perkins, Ph.D., Adelphi Academy, Brooklyn, N. Y.
Frank E. Plummer, 615 Maple St., DesMoines, Iowa.
August Pohlmann, Pennsylvania College, Gettysburg, Pa.
Charles Pratt, 132 Clinton Ave., Brooklyn, N. Y.
W. O. Pratt, Pratt Institute, Ryerson St., Brooklyn, N. Y.
William Ranney, Union Theological Seminary, N. Y. City.
J. H. Raymond, M.D., L. I. College Hospital, Brooklyn, N. Y.
Robert Reach, 8th St., Philadelphia, Penn.
Rev. D. A. Reed, Y. M. C. A. Training School, Springfield, Mass.
Isabel Roach, 149 Whitehall St., Atlanta, Ga.
E. L. Richards, Yale University, New Haven, Conn.
Emma Roberts, 7 Baltimore Block, Atlanta, Ga.
L. S. Russell, 201 K St., S. Boston, Mass.
Ezra W. Sampson, Newtonville, Mass.
C. L. Scudder, M.D., 94 Charles St., Boston, Mass.
F. N. Seerley, Y. M. C. A. Training School, Springfield, Mass.
Helen F. Serconbe, M.D., 428 Jackson St., Milwaukee, Wis.
T. Shinoda, Higher Normal School, Tokyo, Japan.
Alma F. Silsby, Lambert Ave., North Cambridge, Mass.
L. F. Small, 27 Kingston St., Boston, Mass.
Mrs. Emma Potter Swift, 100 Charles St., Boston, Mass.
Adrienne Tyson, Box 247, Atlanta, Ga.
A. H. Van Cleve, M.D., Berlin, Germany.
Minnie Van Pelt, 200 Boulevard Atlanta, Ga.
A. C. Wadsworth, Adelphi Academy, Brooklyn, N. Y.
Jerome Walker, M.D., 8 Seventh Ave., Brooklyn, N. Y.
S. G. Webber, M.D., Adams Nervine Asylum, Jamaica Plain, Mass.
Willis Westmoreland, M.D., Atlanta, Ga.
Maitie Wheeler, Box 247, Atlanta, Ga.
John S. White, LL.D., Berkeley School, 44th St., New York City.
Edith Wood, West Richfield, Ohio.
Sattie L. Wright, Terre Haute, Ind.

PROCEEDINGS

OF THE

AMERICAN ASSOCIATION

FOR THE ADVANCEMENT OF

PHYSICAL EDUCATION,

AT ITS

SIXTH ANNUAL MEETING

HELD IN

BOSTON, MASS.,

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Prof. D. A. Sargent.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF PHYSICAL EDUCATION.

REPORT OF THE SIXTH ANNUAL MEETING.

The annual business meeting of the Association was called to order at the rooms of the Boston Normal School of Gymnastics, 9 Appleton St., Boston, Mass., at 11 a. m., April 3, 1891, by President Sargent.

The report of the Treasurer, Dr. Anderson, was read, accepted, and ordered on file with the Secretary.

The report of the Secretary, Dr. Hitchcock, Jr., was read and accepted.

The new members, whose names appear enrolled in this report, were elected.

The following list of officers were then elected for the ensuing year.

President	E. M. Hartwell, A.M., M.D.
Vice Presidents	Claes J. Enebuske, A.M., Ph.D. Eliza M. Mosher, M.D. Jay W. Seaver, A.M., M.D.
Secretary	E. Hitchcock, Jr., A.M., M.D.
Treasurer	W. G. Anderson, M.D.
Council with above	D. A. Sargent, A.M., M.D. Alice Hall, M.D. Luther Gulick, M.D.

At the close of the literary exercises on April 4th, Dr. J. W. Seaver offered the following amendments to the constitution, their adoption to be voted upon at the next annual meeting of the Association :

Article IV to read " * * * * who with these additional members" and the ex-Presidents of the Association for a term of five years, each from the time of their holding office as President, shall constitute the Council.

ARTICLE V—COMMITTEES.

SECTION 1. There shall be three committees of three members each, appointed by the Council at the time of the annual meeting. One member of each committee shall be appointed for a term of one year, one for two years and one for three years. After the first year it shall be the duty of the Council to appoint one member for a term of three years, at each annual meeting.

§ 2. The chairman of each committee shall be the member with the shortest unexpired term of office.

§ 3. The first committee shall be a committee on Anthropometry and Vital Statistics and shall report to the Association on publications, statistics, historical material, new methods of securing data, new lines of investigation, etc.

The second committee shall consider and report on matters pertaining to the bibliography of Physical Education, and take steps to secure a library of exchanges, etc.

The third committee shall consider and report on all matters pertaining to the practical side of Physical Education, the extension of the work, new views of physical training, new apparatus, buildings, appliances, etc.

§ 4. Each committee shall report in writing to the Association at its annual meeting and these reports shall be subject to the will of the Council as to publication in full or in part.

ARTICLE VI—MEETINGS.

ARTICLE VII—REVENUE.

ARTICLE VIII—QUORUM.

ARTICLE IX—AMENDMENTS.

The fifth by-law was ammended so that at its conclusion it shall read "and pass favorably or adversely on all applications for memberships."

The following persons were elected to honorary membership: F. S. Galton, F.R.S., Mrs. Mary Hemenway, H. P. Bowditch, M.D., Charles Roberts, F.R.C.S., Charles W. Elliott, LL.D.

Following are the literary exercises held at Union Hall, 48 Boylston St , at 2:30 o'clock p. m., April 3rd:

Paper by the President: "Is the Teaching of Physical Training a Trade or a Profession?"

D. A. Sargent, M. D., Director of the Hemenway Gymnasium, Harvard University, Cambridge, Mass.

"Physical Education in Colleges."

Rev. William DeWitt Hyde, D.D., President of Bowdoin College.

" A Comparison of Measurements of Men and Women from our Colleges."

E. Hitchcock, M.D., Professor of Physical Education and Hygiene, Amherst College.

"The Growth of Children, studied by Galton's Method of Percentile Grades."

Prof. Henry P. Bowditch, M.D., Dean of the Harvard Medical School, Boston, Mass.

"Physical Education in the Young Men's Christian Association."

Luther Gulick, M.D., Superintendent Department of Training Physical Directors, School for Christian Workers, Springfield, Mass.

8 O'CLOCK, P. M.

Illustrated paper on " Athletics *versus* Gymnastics at Home and Abroad."

E. M. Hartwell, M.D., Director of Physical Training in the Public Schools of Boston.

Paper by Francis Galton, F.R.S., London, England.

Read by the Secretary, E. Hitchcock, Jr. M.D.

SATURDAY, APRIL 4TH, 10 O'CLOCK, A. M.

" Physical Training in the Regular Army."

Charles R. Greenleaf, M.D., Lieut. Colonel and Surgeon, U.S.A. Washington.

" Some of Galton's Tests in Investigating the Origin of Human Faculty."

Kate C. Hurd, M.D., Director of Physical Training in the Bryn Mawr School, Baltimore, Maryland.

"Physical Culture in the Public Schools of Kansas City, Mo. System of Exercises, Instruction, and Supervision. Results.

Mr. Carl Betz, Director and Supervisor of Physical Culture, Public Schools Kansas City, Mo.

" A Determination of the Muscular Strength of Growing Girls, and its Relations to the Etiology, Treatment, and Prognosis of Cases of Lateral Curvature of the Spine."

Charles L. Scudder, M.D., Assistant in Clinical Surgery, Harvard Medical School.

At the close of the Literary Exercises, the Association by special invitation visited some of the following gymnasia where in most cases special illustrations of practical work were given :

Allen Gymnasium, Charlesbank (open air) Normal School of Gymnastics, Young Men's Christian Association, Posse, Turn Halle, Young Men's Christian Union and Young Women's Christian Association.

Papers Read Before the Convention.

IS THE TEACHING OF PHYSICAL TRAINING A TRADE OR A PROFESSION?

D. A. SARGENT.

Under this title I purpose considering some of the features of our work, which seem to me, at this time, to merit special attention. In so doing I shall only hope to deal with fragments and suggestions, as the time I shall allot to myself, will not allow of a more exhaustive treatment.

In looking over the history of Physical Training in this country, it is interesting and instructive to notice to what an extent its progress has been accompanied by improvements in buildings, grounds, apparatus and facilities for exercise. The amount of money expended in the United States on gymnasiums, Athletic Club buildings and grounds, apparatus, etc., is difficult to estimate accurately, as many athletic organizations have rooms in buildings used for other purposes—but it may be roughly stated that between 1860–1870, it was $200,000; between 1870–1880, $500,000, and from 1880 up to the present time considerable over $5,000,000.

What is the significance of this increased material growth in our work, and what is our responsibility in regard to it? Undoubtedly, the great prominence given to athletics at the present day has increased the interest in Physical Training, and added to its material advancement. But back of every prominent athletic club, there is a good gymnasium, and no college, school, or Christian Association is fully equipped for service unless it has an exercising room of some sort in connection with it. The success of the modern exercising room or gymnasium, is largely due to the improvements in apparatus that have been made within the last fifteen years.

Did the time permit, it would be interesting to trace the evolution of the apparatus introduced in this country as early as 1825, to the present equipment of a first-class gymnasium. In every case, we would find a gradual adaptation of means to ends. An alteration in the form and structure of the apparatus, or the material of which it is made, to suit some peculiar conformation of the body, to facilitate the performance of certain feats, or to broaden the range of exercises and prevent accidents.

Nearly all of these improvements have been made by men who were experts in the gymnasium, and gave their suggestions to others, or by men who added to their knowledge of gymnastics some idea of mechanics. Among this latter class may be mentioned such men as Charles Spencer, of London, who perfected the horizontal, vaulting and trapeze bars by the introduction of the steel rods through the center. Medart of St. Louis, who brought the parallel bars to their present state of perfection, and Gloy of Chicago, who moulded the German Horse and Buck into the form which is now most acceptable.

I might go on to speak of others who have aided in the perfection of the Indian Club, vaulting pole, running-track, running and walking shoes, catcher's masks, etc., etc., but I should only be repeating the names of men who are already familiar to you as experts in some kind of athletic specialty.

Now I am aware that to a certain portion of my audience these things may seem of trifling importance, so would the peculiarities of pens to persons who were never in the habit of writing. What the horse is to the rider, the rifle to the marksman, or the instrument to the musician—so is the apparatus to the gymnast and athlete.

Perfection of detail from a technical standpoint in balls, bats, racquets, skates, boats and all kinds of appurtenances with which experts practice, is a matter of the greatest importance to Physical Training, for, to a large class of young men, it simply means the difference between these agents being used or not being used. Physical Training is at best a process of allurement in which a portion of our youth are induced to make muscular exertion in hope of winning some immediate reward in the shape of a prize, or a championship, with its local renown and social privileges.

This may not be a high aim, but it is what our schools and colleges have taught us for centuries, and it is a difficult task to overcome these traditions and get our young men to adopt a higher and nobler standard.

Some of us are engaged in studying the results, as well as in developing methods of physical training, and I think I can bear testimony to the good effects of athletic sports and heavy gymnastics—even though the ultimate object has not been the development of the physique.

But ninety per cent. of the general population are shut out from the practice of athletics, through circumstances which they cannot control. To this class Free Movements, Light Apparatus and the Developing Appliances have proved a great boon, not only opening up the possibilities of the gymnasium to them, but enabling them to carry its advantages to their very homes. Here again, the invention and development of the new system of apparatus which has been so extensively adopted, was the work of men who were both experts in physical training and natural mechanics.

To these requirements it was only necessary to add a knowledge of Anatomy and Physiology to make the apparatus applicable to the wants of the human organism.

Should we enquire for the men who have perfected the athletic grounds and gymnasium buildings, devised the new apparatus for bathing, improved the dressing accommodations, and brought about the many other material changes that have contributed so much to make exercise attractive—we should find in most cases that they were experts in Physical Training with some ideas of mechanics, or mechanics who had drawn upon experts for their technical knowledge of gymnastics and athletics. If then the advancement of Physical Training is so closely related to improved apparatus, grounds, buildings, etc., what should be the relation of the teacher to the mechanical or material side of this great subject?

Perhaps the best way to answer this question is to first ascertain what the teacher's relation has been to the apparatus in the past, and then consider what it is at present.

In so doing I shall have to make some comments on the qualifications of some teachers.

The old style apparatus first used in this country was modeled after that used in Germany. It was reverenced for its traditional value and for a long time no one thought of changing its structure. The gymnast adapted himself to its form and proportions very much as a horse adapts himself to his load and the kind of vehicle he has to draw it in.

After mastering the peculiarities of one piece of apparatus one seldom had the temerity to struggle successfully with another, and thus at an early stage in the history of the subject specialists began to be developed. In those days when a novice first came to the gymnasium, the question was—not what can the apparatus do for the young man, but, what can the young man do on the apparatus. There were few light pieces with which one could develop himself gradually, so it was thought necessary to plunge at the heavy work at once. The first efforts were generally received with laughter and ridicule, and the novice was put through a process of "guying" as the slang phrase goes, which only a few survived. Those who had the moral and physical hardihood to sustain this kind of abuse became adepts in the use of one or two pieces of apparatus—the others being discouraged in finding nothing in the gymnasium adapted to their physical needs, either dropped out altogether, or remained to swell the admiring throng that stood around to applaud the feats of the expert performers. Undoubtedly the men developed during this period were good gymnasts. They were put through a trying ordeal of blistered hands, bruised limbs and sprained ankles and wrist, that proved their metal, but it did not leave them in a pleasant frame of mind towards new comers, or with the kindest sympathy for beginners.

A more conceited, egotistical, vain-glorious set of men than the old school gymnasts I have seldom met except among a certain class of semi-professional athletes. From this school, the gymnastic teachers in the period between 1860 and 1880 were chosen. Notwithstanding the low aims and mistaken motives that guided the instructors at this time, I deem it a rare good fortune to have had, at an early age, the training and discipline imparted by the old school. It was a keen recollection of the trials and difficulties of the beginner, as well as the self-inflicted hardships of the experts under the old régime, that must have led to the gradual re-modeling and improving of the heavy apparatus to which we have previously alluded.

Certainly it was my appreciation of how little the novice was able to do at the outset, and how few men who came to the gymnasium really found anything or anybody to help them, that prompted me to the efforts I have made in trying to devise new appliances for exercise and development. One great object of these appliances was to make everything so simple that a child could easily learn and execute the movements after once being shown how.

It takes, for instance, only thirty minutes to learn all the customary movements with the chest-weights, while it will require a half hour's practice a day for a year, to learn and execute all the exercises with the Indian Clubs. Yet the chest-weights are much superior to the clubs as a means of attaining a good general development.

I might go on to speak of other advantages of the developing appliances, such as the capacity for being adjusted and regulated, their adaptability to different local conditions, etc., etc., but all these things are pretty well known to the general public and have contributed a great deal to the popularity of this kind of apparatus.

But what has this apparatus done for the teacher, and what in turn has the teacher done for the apparatus?

Soon after these appliances were introduced to the public, there was a great demand for them. They were designed for educational purposes and not protected by patents. Everybody was free to make and use them. The Hemenway Gymnasium was open to anyone who wished to inspect, measure or try the new apparatus. Quite a number of both sexes availed themselves of this opportunity.

Some stopped a few minutes, others a few hours, and two or three several days—but most of them (as I afterwards learned to my discomfiture) mastered the Sargent System, so called, and went forth to practice it upon the unwary public.

Strange as it may seem, some of these transitory visitors obtained good positions on the strength of their rapidly acquired knowledge at Cambridge, and have not only taught their own pupils, but have even essayed to teach those who are to be teachers.

(This enterprise has only been excelled in my experience, by a young man who wrote me recently from the west, enclosing a circular of a Normal School in Gymnastics he proposed to open in September, provided he got applications enough to warrant him in attending the Summer School for five weeks in Cambridge.)

If the old school gymnasts were conceited, they had something to base it upon, when compared with the qualifications of many of the primitive teachers in the modern school. In most cases their only qualifications were a good address, and a knowledge of a few of the movements on the developing appliances, which, as I have previously stated, any one can learn in half an hour. This is the class of teachers who discouraged all work on the heavy apparatus because they did not know how to use it—thus driving the heroic element out of the gymnasium into athletics or dissipation.

This is the class of teachers who would turn the gymnasium into a hospital or sanitarium, where they will attempt to treat all diseases on the apparatus—for an extra fee—from an organic affection of the heart, to spinal curvature of the third degree.

Among this class also may be found those enterprising teachers who exact a commission for everything used in the gymnasium, from a cake of soap, to an exercising suit, or a complete equipment of apparatus.

I know this last offense is sometimes condoned by teachers in good standing, on the ground that it is the practice in all trades and professions, and if some teachers and superintendents of schools receive commissions on new books and apparatus introduced—we cannot expect teachers of gymnastics and superintendents of gynasiums, who, as a class are much poorer paid, to be exempt from this evil. In my opinion, however, the gymnastic teacher, man or woman, who receives a commission for recommending his pupils, or the institution he represents [illegible] go to certain tradesmen to purchase shoes, clothes, apparatus, etc., or who allow for a pecuniary consideration, certain goods to be put on sale at the gymnasium, to the exclusion of other goods, irrespective of their superior quality or merit, is not only guilty of conduct unbecoming a lady or gentlemen, but he is also guilty of conduct that is tending to degrade the work in which he is engaged, and reduce it to a business or a commercial enterprise instead of a profession. Now I know that there are those present who will think I am treading on rather dangerous ground, in view of the fact that I have always supervised the making of my own apparatus. As some of my colleagues in this association have been so unkind and discourteous as to accuse me of dealing in proprietary goods, I wish to put myself on record in speaking of the commercial aspect of the subject. In so doing I beg that my hearers will pardon my apparent egotism, as I shall be obliged to speak of my own experiences.

Soon after the new apparatus was brought before the public in my gymnasium in New York, there began to be a demand for the developing appliances and the new style equipment. My answer invariably was—here is the apparatus; you are at liberty to take all the dimensions you chose, and have it made by any one you may select—but the reply invaribly was—you have the original patterns and designs, and it will be more economical for us to have your carpenters make the apparatus than it will to get up new patterns and make it ourselves. Thus I found myself at the outset, engaged in manufacturing apparatus. After coming to Cambridge this grew to be such a nuisance, that I attempted to put that side of my work in the hands of a manufacturing company. In order that the apparatus should do what was expected of it, it was necessary that it should be made of a certain quality of material after designs that had been carefully worked out, and which had a very important bearing on the anatomical and physiological side of the work.

About this time certain unscrupulous parties, whose names I will not mention, notwithstanding their personal attacks upon me and this association, began to see the commercial value of my apparatus and to decorate it with patent labels bearing the name of the Boston Gymnasium Supply Co. For every one of these labels so deposited, this company was liable to a fine of $100, for it had committed a criminal offense, and but for the childlike simplicity of one of the partners, whom I released from responsibility because he pleaded ignorance of the law—the U. S. government would have received some addition to its treasury.

As I had taken out no patents, I not only felt the keenness of this insult, but found that I had either got to disown my apparatus, or take measures to protect myself against the recurrence of such an unwarrantable procedure.

I also found that few manufacturers cared to invest their capital in the necessary plant and machinery for making the apparatus unless they could be protected by patents. As most of the apparatus had then been in use over two years, the best pieces could not be patented. Patents were secured, however, on some of the attachments and the manufacturing began. I soon learned that the motives that animate the manufacturer, and the motives that should animate the instructor, are not exactly the same. The former feels the pressure of competitors and fights for *quantity*, the latter feels the criticism of his profession and fights for *quality*. One wishes to make the apparatus as cheaply as possible in order that it may return the largest profit to the manufacturer. The other wishes it made as *nicely* as possible in order that it may yield the best results to the individual who uses it. The term professional pride, the manufacturer does not understand. The only possible good he can see in the instructor, after the latter has given up his patterns and designs, is the use of his name to bolster the price of cheap apparatus, and help to push its sale among the confiding public. Some of us do not like to have our names used that way, though others are not so particular.

Perhaps these instructors do not value their names, or may be they think the free advertising and cheap notoriety thus gained by endorsing apparatus not their own, compensates them for all their trouble. Or perhaps the same proposition was made to them as was made to the originator of the apparatus; and only their kind consideration for his welfare prompted them to give the endorsement.

Another evidence of this commercial zeal to which I have alluded, is the copyrighting of illustrations of my apparatus that I did not patent. The presumable object of this insolent procedure is to prevent any other person, myself included, from using these illustrations in writing books, magazine articles, etc. But perhaps the best exhibition of this mad craze and insatiable desire for fancied wealth was show by that bashful young man with a cane, who brought a suit against me for using my own apparatus without a patent, which he claimed to have, and put me to considerable expense to show legally priority of use. This same commercial zeal, which I have encountered in my personal experience with manufactures, is more rampant to-day than ever. It has insinuated itself by way of advertisement, into our official reports, it has put the manufacturers wares on exhibition at our annual meetings, it is publishing and editing papers, magazines and books on the various branches of physical training. It is corrupting the secretaries in some of our Christian Associations, the principals of some of our schools, and the directors of some of our athletic clubs and gymnasiums. It is planning gymnasium buildings equipping them with apparatus, and even assaying to place instructors who obligate themselves to be puffing agents and salesmen on commission.

But how is the objectional tendency to be dealt with ? We have seen that the progress of Physical Training has been greatly advanced by the invention of new apparatus, and improving the form and construction of athletic buildings, grounds, etc.

We have also seen that these inventions and improvements have been largely the work of experts in physical training, and that manufacturers had now appropriated everything they could in the way of apparatus, ignored the scientific aspect in construction, and the intelligent directions for its use, and were pushing its sale for the purpose of making money.

When we come to enquire more minutely into the cause of this condition of affairs, we find it mainly to be a sentiment in the minds of medical graduates and teachers connected with our higher institutions of learning, that any invention or discovery made in the interest of humanity, such as the discovery of a new remedy for disease, or the invention of a new surgical instrument or life-saving, or health-promoting apparatus, etc., should not be covered by a patent, but should be left open to the use of mankind at large. This is undoubtedly a noble and philanthropic sentiment, but in view of my past experiences, I have come to believe that it may be false and misleading.

If the community could be assured that articles having a commercial value, not patented by professional men, would not be patented by anybody. If professional men themselves could be assured that articles not patented, but open to competition, would be free from adulteration and misrepresentation, there would be a more solid basis for the prevailing sentiment. But as it is, any person may obtain a patent by applying to the U. S. P. Office and swearing that he is the original inventor. The person or persons to whom the patent is granted, is in the estimation of the courts, the lawful owner, until it can be proved to the contrary.

Thus a man who originates a new piece of apparatus, must proclaim this fact to the world through the public press—which is a very disagreeable thing for many persons to do—or he must apply to the U. S. Patent Office for a caveat or patent—in order to ensure him the protection which the government only grants to patentees. Failing to take either of these courses, he is liable to be sued as an imposter or infringer for using his own apparatus, and may have to be put to considerable expense to keep out of jail.

In my opinion this is hardly the way to *encourage* the development of the arts and sciences, and I cannot help thinking that a college or one of its officers would be put in a much more dignified position before the public by following the usual custom. If it is not objectionable for a professional man to take out a copyright, no reasonable objection can be made to his taking out a patent. In both cases the government grants its protection—not on an idea—but upon a material thing that has commercial value, whether it be a book or a chest-weight.

Another objection to patents which has some weight in the minds of certain people is purely a sentimental one, based remotely upon the ancient custom of slavery, and on the opinion that once predominated as to the nature of mind. As this objection strikes at the very heart of our calling as physical instructors, it is worthy of more than a passing consideration. The idea long prevailed that men who work with their hands, or with their hands and brains, and deal with material things, must necessarily be of a lower social order than those who work with their brains alone.

The absurdity to which this idea has been carried may be inferred from the fact that the social position of a surgeon in England to-day is of a lower order than that accorded to a physician—presumably because the former engages in a manual occupation—once performed by barbers—while the latter writes a prescription couched in mysterious terms, under a sign of invocation—after the custom of the priests and medicine men of primitive races. This idea has left its coloring on the public mind even at the present day. It stands as a menacing objection to operative surgery, and the practice of orthœpedics.

It opposes the medical treatment of disease, and would even make good nursing and the practice of massage a menial occupation.

It is the idea that has long opposed any attempt to give importance to physical exercises in our schools and colleges, and make them a part of the regular curriculum. It influences the character of our exercises, regardless of their physiological importance, and often substitutes a lot of lifeless movements under the head of psycho-physical culture, or some other taking term, implying that the mind and soul are not being neglected even while the body is receiving its training.

Finally this old medieval notion as to the sacredness of the mind and the vileness of the body has influenced the work of many gymnasium instructors leading them to neglect to prepare themselves in all sound practical floor exercises—while they spent most of their time studying the mental side of the work embraced in the theory of evolution and development, and the long list of books usually read by candidates for a medical degree.

If we would do all we can for the advancement of Physical Education, we must recognize at once the evils, prejudices and tendencies that threaten to retard its true progress. We can only do this by realizing the breadth, scope and manysidedness of the calling in which we are engaged, and urging those who are entering upon it as a life work, to qualify themselves for the highest positions. In attempting to do this they must not spurn the material side of this great profession. The invention of a good school chair and desk that can be readily adapted and adjusted to the growing youth who have to occupy them for so many years is worth more to the cause of physical education, than the invention of a dumbell drill or lists of wand exercise, for the muscles of the body and limbs are wrestling with the seats and desks from four to six hours a day, while they will not be engaged with the bells and wands more than as many minutes.

The same may be said of the subject of ventilation, dietectics, the construction of schools, buildings and workshops. The man who can improve on these health agencies, will do more for the improvement of the average physique than it is possible for the best teachers to do with physical exercise alone, because air, food and our material surroundings are constant factors from the good or evil influence of which we cannot escape. Anything that makes the gymnasium more attractive and serviceable to the community—whether it be improved apparatus, bathing facilities, methods of lighting, heating, ventilating, or even decorating are objects of the greatest importance, because they are more or less constant in their influence. The individual dies but the institution lives. Muscles and brains get weary with teaching, but wood and iron never get tired. These material substances are always on duty, even though the mind and hands that fashioned them into serviceable shape, and directed their use—may have passed away.

When our schools and colleges give up their text-books and physical and chemical apparatus as an assistance to teachers and an aid to mental development, it will be time to talk of dispensing with apparatus as an assistance to gymnasium teachers and an aid to physical development.

But some of you may say, are these not matters that had better be left to architects, builders and manufacturers? With all due respect to these gentlemen, I must affirm that the planning and construction of athletic buildings, gymnasia and their equipment cannot safely be left to their judgment. Did the time permit, it would be instructive to this association to go through the different gymnasia of the country and mark the blunders and mistakes of architects, builders and manufacturers. These men cannot be expected to compass the whole range of human knowledge, and it might reasonably be presumed that teachers who were devoting their lives to the development of a certain subject, could give them some suggestions as to the plan and structure of the building where the teacher's work was to be carried on, and the nature and construction of the apparatus they were to use. Suffice it to say that some architects do recognize this fact, and are willing to pay for the services of an expert. The point that I wish to lay stress upon is, that making the preliminary plans and specifications for gymnasium buildings and grounds, the invention and designing of apparatus, and the improvement of all the material surroundings that effect the work of the teacher come within the legitimate scope of his profession, and where the expert service is not rendered to the institution from which he is drawing his salary, this service should be paid for by the architect, builder or manufacturer to whom it is rendered.

If the builder or manufacturer is allowed to dictate what a gymnasium and its equipment should be, the position of the instructor is subordinate to that of the artizan, in other words, the trade rules the profession. Considering the difference in the motives that dominate the two callings it does not require a very remarkable degree of discernment to see that the profession of Physical Training doomed, unless some restriction is placed upon the province of the builder and manufacturer.

Practicing physicians have had to work out a similar problem with a certain class of apothecaries and drug manufacturers, and the sooner our profession grapples with the commercial octopus, the more likely we will be to attract men of character and ability to our ranks.

There is a fine opportunity here for honest manufacturers—and I assume that there are such—who will not appropriate what does not belong to them and cover it with patents, who will conduct their business in a legitimate manner, and who will confine their efforts to making apparatus, and not extend their province to the prescription of its uses. With such a firm, our profession would place its confidence and its trade.

Another way in which instructors in Physical Training will tend to establish their calling as a profession, is first to master the ordinary range of gymnastic and athletic exercises, and then study the great subject of diagnosis, and the application of different physical agents to the different constitutions and conditions that confront us from the different walks of life. This implies considerable knowledge of Anatomy, Physiology and Hygiene. Animal Mechanics and Anthropometry, for special studies, and an acquaintance with the general subjects embraced in the requirements of a liberal education. I would not imply that a college-bred man, and medical graduates are the only ones likely to meet the full requirements of the best positions in Physical Training. Certainly they are not the ones who are doing the best work at the present time. The college men usually accept the directorship of the gymnasium or of athletics, to help them towards some other profession, while the medical men with few exceptions are too much engrossed in caring for the sick to give more than a few hours a week to the supervision of the work at the gymnasium. In my opinion, the coming instructor in physical training is to be neither a Bachelor of Arts nor a Doctor of Medicine, but a person specially educated both mentally and physically for the manifold duties of this new profession, with a degree befitting his qualifications and attainments. Such instructors are now the crying needs of the hour, and I do not know of a more inviting field for young people to enter, or one that is likely to bring forth a richer harvest in the next twenty-five years than the field of physical training in its highest and noblest acceptation. To this field we invite the young, the vigorous, the brave. As an inducement for promising candidates to enter the work, our institutions of learning, and our Christian Associations ought to pay better salaries. The time has gone by when these institutions can afford to work the gymnasium as a paying investment and allow the instructor to eke out a living compensation by giving boxing lessons extra, or peddling shoes and clothes. It is not to the credit of any institution to boast of making from three to five thousand dollars profit per annum from its gymnasium, if its accommodations are insufficient and its instruction below the standard.

I know it may be said that the profit from the gymnasium is often used to further the cause of Christian religion, or to sustain other departments of instruction. All honor the gymnasium for this contribution—but is it not quite time that the body received a little attention for its own sake? Neglected and despised for centuries, it is just beginning to be treated as a co-worker with the mind. Let the union be complete—let the training of the body become a regular part of our school, college and Christian work, and in that way we shall not only advance the cause of physical education, but we shall also lay the foundation for a better mental and moral education.

DISCUSSION.

Luther Gulick, M.D. — I believe that discussion can be made as valuable as the papers themselves. I confess that the subject presented has not excited in my own mind the apprehension that it has in the mind of Dr. Sargent. If we examine the history of the rise of the professions we shall see the same difficulties, and we can follow the method which Evolution indicates in the solution of these problems. It would be easy to prove that it would be better for the medical profession if the inventors of instruments, apparatus, and drugs should themselves control those things. Yet the history of the professions is the other way. It has been the gradually increasing opinion of the best men of the world, in regard to scientific matters, that this is unwise, undignified. It does not advance the professions, I should not feel justified to form a judgment in regard to all professions from the experience of any one. I should rather be willing to form my estimate of any one profession from the results of others that have grown up. That is the true method of Evolution and I believe that would bring us to good results.

Walter Channing, M.D. — It has not been the custom for the medical profession to patent apparatus. That is contrary to the professional spirit. I do not think of anything now in the way of surgical apparatus that has been patented. None of the great medical discoveries, such as the use of ether and chloroform for anaesthesia, have been patented. In this respect the medical profession has been different from dentistry. In dentistry all sorts of appliances from the smallest sort of drill or toothpowder to the most elaborate apparatus have been patented. They are in the hands of dental combinations. The result is that, until recently, the standard of dentistry has been low. The patenting of anything in the medical profession has had a bad influence professionally, and I do not remember any embarrassment arising out of the invention of any piece of apparatus because it was not patented. Take such a man as Dr. H. J. Bigelow, one of our most distinguished surgeons. He invented a great many pieces of apparatus and I never knew of his meeting any embarrassment from the fact that none of them were patented. I think it would have handicapped him, and have prevented the world from being benefitted by his inventions, had they been patented. If that holds good in my profession, I do not see why it should not hold good in others.

Dr. Sargent.—Does Dr. Channing know anything of the practice of manufacturers of instruments, as for instance, the makers of instruments for the feet and spine, where the instrument maker prescribes for the condition of the patient and makes apparatus without advice from the physician? Is not injury sometimes done in this way to the patient?

Dr. Channing.— Those cases are of such rare occurrence in comparison with the general use of all forms of apparatus that they might be thrown out.. It is possible that harm might be done on a small scale by some unprincipled instrument maker. No surgeon would regard it as a wise professional thing to patent surgical instruments.

Dr. Sargent.—Is it regarded as unprofessional for physicians to derive a profit from manufacturers as a commission for sending them patrons?

Dr. Channing.—I do not know of such cases.

Dr. Sargent.—My attention was called to that by reason of a recent report of a State Board of Health, in which that matter is referred to at considerable length, showing the tendency of a certain class to put themselves in the hands of the druggist and apothecaries.

Dr. Smith.—There is a distinction between a profession and a trade ; a profession being a calling that requires special learning, and a trade being an occupation of manual labor. It seems to me that we ought to make a decided line between these two, and know just what belongs to the mechanic and what to the profession. We are not dealing with apparatus, but with men's bodies. It seems to me that each of us has his legitimate work. There are two things that very few will question. I think the majority is against our dealing in goods in gymnasiums, selling suits, etc. We are not merchants, tradesmen. I think the majority is against our receiving any commission on anything that we may suggest or do. We are not commission merchants in any sense. According to the most liberal code or ethics of the New York Medical Society it is a discourtesy, and non-professional, for a man to allow his name to be used upon a patent. A man who patents a medicine and sells it is thrown out of the Society. It seems to me we should apply that rule, as we go on to our profession. We let the architect have his place. If we invent an instrument or a piece of apparatus there is no objection to our name going with it. In surgery the names are used but they are not patented. Anyone can make them and use the names of the inventors. There are combinations in New York who manufacture trusses and sell them and give the professional man a commission on the patients sent to them. That is not right. The profession should not receive commissions from such men. Let the mechanic be a mechanic, and the professor a professor. We, who are working together in a profession should do all we can for that profession, turn everything that we get into the profession, and let the tradesman have his legitimate, and the profession its legitimate work.

Dr. Sargent.—I am glad that Dr. Smith can see the line of demarkation that separates the profession from the trade. I can not see it in that way. Perhaps I have had more experience on both sides than Dr. Smith. It is the custom in the Children's Hospital to have the instruments manufactured on the premises. Artisans are employed who work under the immediate supervision and instruction of the physician. It is so in Dr. Taylor's establishment in New York. It is so in some of the best orthopedic hospitals in Europe. I think there is a confusion of terms probably in the minds of those who have gone into the profession from medicine. It seems to me that the practice of orthopedic surgeons, and those who have to do with spinal curvature and children's diseases are the ones for us to be governed by. What has been their experience, and what is their practice ?

Dr. Smith.—I agree with Dr. Sargent that instruments should not be made by the man who prescribes them.

Dr. Sargent.—We need to make that line as clear as possible. The two are merging together. The manufacturing companies are increasing so rapidly, and they handle so much capital that they can handle teachers. That is the unfortunate part of it.

Dr. Seaver.—I think that our manufacturers of apparatus are just about to play the "Kilkenny cat" drama over again, and that the result of it is that the man who has the best apparatus will be the one who will supply the gymnasium of the future. This work of manufacturing must be left to the manufacturer in the end. I am too busy to do it. In the way of making apparatus, I direct the manufacture of it. I believe that in the end unscrupulous manufacturers will meet the disastrous results that always come to underhanded operations. The "survival of the fittest" will be true of manufacturers.

Dr. E. M. Hartwell.—If it is difficult to see just what we are, members of a profession or tradesmen, it is because of the somewhat confused aims that we have. I am in doubt whether the direction of gymnasiums, take them by and large, is a profession. It would be a good thing if it were, I doubt if it be for the best interest of physical trainers that they should have much to do with the manufacture of apparatus, or the copy-righting of lists of exercises, dumb-bell drills, and the like. As long as our eyes have been opened to the present condition of things, it would be just as well if we looked a little at the history of other professions, as for instance, medicine and teaching. The experience in both of those professions is, that it is not wise for men to put themselves in the position of accepting anything from tradesmen because of their influence in recommending pupils or patients to buy special articles of them. This rule applies, it seems to me, to buying jerseys, or gymnasium slippers or hats, or quinine, or trusses. If anybody came to me and offered me a commission for shoes or hats, I should ask what I had been suspected of doing that I should be considered open to such a proposition. I should look upon it as an attempt at bribery and corruption. In the long run I think the custom of the medical profession should prevail with us. Scientific and medical men, orthopedic surgeons and the like do not patent their devices. Their names go upon them, but they are given to the public for the public benefit. They are given through the profession, to be sure, but they are intended for suffering humanity. If our patent laws are in such a condition that if I make a piece of apparatus for the gymnasium of my own devising, and I am stopped from using that because some one steps in behind me and claims it, I should be inclined then to consider whether, under certain circumstances, it might not be best for the sake of humanity to seek a patent. But it seems to me that human nature in this part of the world is about what it always has been, and if there is an opportunity to make a dollar, or a hundred, or a thousand dollars, from the activity of mind or inventive ingenuity of any disinterested uncommercial person, there always will be plenty of people who will step into the gap, for the sake of gain. I think one great trouble with us is that this whole matter of physical training is in the apparatus stage. What we want is a larger number of people who can think and teach without always needing apparatus to carry out their views. I do not think that colleges and higher institutions of learning have showed any great amount of insight and scientific interest in this matter of physical training. It has become a matter of fashion because certain colleges have led off by putting up expensive and elaborate buildings which they call gymnasiums. We shall not at once get out of the brick and mortar stage ; not until we convince the trustees that some thousands of dollars would better be spent upon professorships and instructorships, and that it should be made worth while for men and women to study carefully and thoroughly this profession, or trade, whichever it is going to be. Meanwhile we should be careful to guard against such mischievous customs as have become a nuisance in the teaching profession, and the medical profession through the rise of organized greed and insolence upon the part of the manufacturers of medicine and school books. Let us take a chapter out of the experience of those professions and profit by it.

PHYSICAL EDUCATION IN COLLEGE.

BY WILLIAM DE WITT HYDE.

Coming before this audience of experts as a humble layman, to expound a system of physical education which we have evolved and put in operation in our little college down in Maine, it becomes me to proceed very cautiously at first, and make sure of some ground of agreement at the start.

By way, then, of the preliminary hand-shake that precedes the "set to" let me propound three axioms on which I trust all can agree.

First. That exercise is best which reaches the largest number, and does most for the weakest men.

Second. That exercise is best which makes the hardest work attractive.

Third. That exercise is best which most coördinates body, mind and will.

First. That exercise is best which reaches the largest number and does most for the weakest men. Developing giants; lowering records; winning races; knocking out opponents are doubtless interesting things to do; but they are no part of that physical education which the college aims to give its students. And success in these feats is no test of the excellence of a system of physical instruction and exercise in an educational institution. College professors no doubt have enough of human frailty in their individual breasts to rejoice in these things when their boys come out on top. But they are not the ends at which, in their official capacity, college faculties aim. Indeed, I suppose most of us are agreed that the students who participate in those contests in which the maximum of muscular development and physical endurance is essential to success, are martyrs to the cause of physical education. They get more physical development than a man needs to carry on his college studies to the best advantage; and they form habits which particularly impose the obligation to keep up after graduation more exercise than is consistent with engrossing professional pursuits. The influence and example of such severe training as a boat crew indulges is healthful and stimulating to their fellow-students; and keeps up the average athletic tone of an institution. But the greater physical benefit comes, not to the eight who race, but to the twenty or thirty who train with them, and either row only in class races, or do not race at all.

The performance of different gymnastic feats on the bars, the rings and the trapeze is likewise of little educational value, except of this same vicarious sort: in that it raises the standard and sets the pace for the average student to follow. A few skillful gymnasts, and a few powerful athletes, are a good thing for a college; even though the value to themselves of this excessive physical training and development may be questioned. The college professor will say of the highly-trained athlete, as Emerson says of the monk:

"I like a church; I like a cowl;
I love a prophet of the soul;
And in my heart monastic aisles
Fall like sweet strains or pensive smiles;
Yet not for all his faith can see
Would I that cowled churchman be."

Intercollegiate athletics cannot be made the basis of a system of physical education in colleges, because it does not fulfill the requirements of our first axiom. It reaches only a small fraction of the college; and it does too much for the strongest, and almost nothing for the weakest men. Whereas, our first axiom is, that exercise is best which reaches the largest number, and does most for the weakest men. Our second axiom is, that exercise is best which makes the hardest work attractive. Now the merit of college athletics is that they perfectly fulfill this second axiom. But we have found them utterly incompetent to fulfill the first.

The elaborately devised drill, adapted to bring each muscle into play by a specially provided movement; set to music; and stimulated by the hope of a prize at the end is a favorite form of physical education in colleges to-day

Now this does very well for schools; and all friends of physical education rejoice at the rapid advance it is making in this city. But it is too childish, too mechanical, too monotonous and dead to be intensely and permanently attractive to the college student. College students do not enjoy pulling first this muscle and then that, like so many puppet players performing upon themselves. They will hate it, and make light of it, and shirk it, and "kick" against it in every way they can. In a word these systems utterly fail to fulfill the requirements of our second axiom. They do not make hard work attractive.

Our third axiom is, that exercise is best which most coördinates body, mind and will. The Sargent system aims to do this. By showing on the chart just where a man stands; by giving him a hand-book in which the way to remedy his deficiencies is pointed out; and by awakening an interest in his own symmetrical development the Sargent system unites to a certain extent, mind, will and body in the work of physical development. And yet this union is in a great measure artificial, external and unreal. The system emanates from the office rather than from the floor of the gymnasium. As a basis of statistical tabulation it is ideal; but college boys are very different beings from tables of statistics; and they cannot all be made to take that interest in the fine points of anthropometrical tabulation which according to the theory of this system they ought to take.

Neither the Swedish, the Amherst, nor the Sargent system succeeds in effecting in the average student, a hearty coöperation and a perfect coördination of mind, will and body, in the work of physical education.

I do not wish to criticise these methods of physical education to which I have referred. At Brunswick all cherish for them all that affectionate regard which one ought always to feel for ladders on which he has climbed to better things. We have tried them all, and many features of each we still retain. We maintain an athletic association for field sports, a college base ball nine, a college football team, and a college boat crew, and to the respectability of the latter the crew of the Athletic Association of this city can testify. We have had for the past four years class drills in calisthenics, class exercises with dumb bells, Indian clubs and wands, ending with an exhibition before a thousand spectators, at which a prize is awarded to the class performing the best exercise.

As is fitting in a gymnasium, generously equipped with apparatus by your president and named for him, we have the Sargent system completely in force. Every student is measured at the beginning and end of the freshman year. Every student receives a chart in which his line is drawn, and a hand-book in which his exercises are prescribed. And Dr. Sargent's first prize for the most perfect man was taken by a member of our Senior class.

While we cherish and use whatever serves our purpose in these other systems, all are naturally most fond and proud of our own offspring; and the characteristic features of our system I will now endeavor to describe.

In the Freshman year the work is preparatory and disciplinary in this as in the literary department. As the Freshman's intellectual work for the first year is mainly drill in Latin, Greek and Mathematics; so in physical education, he first receives sufficient military drill to give him individually an erect form and graceful bearing; and to enable the class to be directed subsequently by military orders. Club swinging is taught during the remainder of the year; as this is found to be an exercise in which a class can most effectively be brought to act in unity, and keep time; and is also an exercise which students sufficiently enjoy to keep up afterwards.

By the end of the Freshman year the class knows how to stand erect; obey orders; keep time; and can endure without fatigue or injury, a half hour of vigorous exercise.

With the Sophomore year our system proper begins. During the first half of the year the class is taught the elements of wrestling. They practice the catches, holds, and breaks at the word of command; and thus require in addition to the exercise as much of the science of wrestling as would be given ordinarily in a first course of private lessons. During the last half of the year a similar course is given in boxing. The students practice the blows and guards at the word of command; and here also in addition to the exercise acquire the elements of the art. At the end of the period, a minute or so is allowed for a wrestling or boxing match between the pairs who have been practicing together.

In the Junior year fencing with single sticks; and in the Senior year fencing with foils and masks is taught in the same manner.

This in brief is our system of Physical education. Let us test it by our three axioms.

First: It reaches every student; and does most for those who are least developed. These exercises are required of every student. Every student is required to be present in the gymnasium, to change his clothes, and exercise in this way half an hour a day, four days in each week from November to March.

The weakest men are required to do as much of this work as the strongest, though for supplementary work on the apparatus, the classes are divided into three squads on the basis of their strength as ascertained by physical examination. In this kind of work there is no opportunity to shirk, for each man has an opponent to keep him at his work, in addition to the general oversight of the director.

It fulfills also the requirement of our second axiom. It is hard work, and the students like it, and enter into it with all their might. Not only is there no opportunity to shirk, there is no disposition to do so. There is in young men a natural fondness for competitive athletic contests. This system takes advantage of that natural fondness. It enlists all the inherent athletic spirit a young man has, and develops it where it is wanting. And at the same time it does it under such control and in such moderation that the evils of excessive competition are excluded. Before this system was introduced the enforcing of physical exercise ranked with the enforcement of attendance at church and chapel as one of the three chief thorns in our official flesh. Since this system has been introduced we have had no more difficulty in getting students to work in the gymnasium, than in getting them to eat their meals. Their interest, their enthusiasm, their rational appreciation of its worth are on the side of the requirement, and it works itself.

To be sure the requirement is supported by adequate recognition in our educational curriculum. The work in the gymnasium counts as one full study for the winter term : and one thirteenth of a student's entire rank for the college course is based on the regularity and fidelity with which he does his work in this department. Still our main reliance for getting the work done thoroughly and honestly is the interest and enthuiasm the system awakens in the young men themselves. If they did not like it, they would have to do it, just as they have to study mathematics whether they like it or not. Yet the spirit in which the gymnastic work is done on this system resembles more the freedom with which students pursue an elective which they like, than that in which they take a prescribed study which they hate. It fulfills the definition of a sound education given by Plato and Aristotle in that it trains the student "to find pleasure in the right thing." This system solves the problem of gaining the coöperation of the student much in the same way as athletic sports : and it reaches those classes of students who most need physical development in a way that football, baseball and boating never can.

This system also meets our third requirement. It coördinates body, mind and will in exercise. We no longer teach reading by first teaching the alphabet, nor spelling by long columns of strange words out of the spelling book, nor language by first committing to memory all the forms, rules and exceptions in the grammar, nor science by reciting by rote the formulation of the text book. We learn to read by reading, to spell by writing ; to translate a language by translating ; to understand a science by performing its characteristic experiments ; and alphabet, orthography, syntax, and scientific generalizations come in by the way where we have occasion to use them, and when we are ready to understand them. In the same way the various methods by which this, that and the other particular muscle is to be built up by this, that and the other particular movement directed to that particular end, are already antiquated for colleges, at any rate, however well they may serve the purposes of school. Physical education must, like all well directed education in our day, give the student a physical task, in which he will take a hearty interest, in and through the vigorous accomplishment of that task, the muscles must be developed, and the heart strengthened and the lungs expanded, in that healthy and natural unconsciousness which always accompanies vigorous prosecution of work in which we delight. Now boxing, wrestling and fencing, exercise every muscle of the body: expand the lungs, quicken circulation, stimulate perspiration: and yet they do it in such a way that the students is supremely unconscious of all these things at the time. The development of his body is not before his mind as an external object, nor is it dependent at every moment on an act of will directed to that specific end.

Body, mind and will are coördinated in the doing of a definite thing; each helps the others; and all are at the same time strengthened and developed. The muscles themselves are more effectually developed, and quickness of eye, steadiness of nerve, resoluteness of will, together with such mental and moral traits as coolness, courage, promptness and decision, are all thrown in. Physical strength thus subjected to quick perception and prompt execution is worth infinitely more from every point of view, than the same amount of mere muscle piled up on the back of a listless and indifferent mind and an irresolute and flabby will. And as an offset to animalism and sensuality, there is all the difference in the world between the mere dead weights of muscle, that hangs off from any corresponding development of volition and intelligence, and the same amount of physical power, presided over by an intelligent interest which called it into being; and controlled by a resolute determination to use it in feats of manly sport. Mere manufacture of muscle is not the end of physical education. The end of physical education is the development of a body strong to support, prompt to obey, efficient to execute the thought and purposes of the man. And this is precisely what is accomplished by the system I have described.

The ultimate test of a system, however, is its practical results. And though this is the fifth year in which we have required regular exercise of every student, the system I have described has been a gradual growth within that period; and this is the first year it has been in operation in its completed form. Still we are able to form some estimate of the educational value of systematic physical exercise. And in order to present facts rather than theories I have drawn up a table, showing the relation between physical development and intellectual work, upon the five classes from 1886 to 1890. The director of the gymnasium has divided the one hundred and fifty-three men, included in those five classes, into three equal divisions of fifty-one each, on the basis of proficiency in physical exercise. The first division is composed of the best athletes in college. It includes the members of the college ball nines, football teams, and boat crews, and the winners of first prizes on field days during the five years.

The second division includes the men of fair athletic development; members of second nines, second elevens, class crews; and contestants who failed to win first prizes.

The third division includes those who took no part in athletics beyond the required exercises of the gymnasium.

I have taken from the college rank book the three equal divisions into which these same one hundred and fifty-three students fall on the basis of scholarship. The first division, fifty one, represents those who have distinguished themselves by a strong, thorough and comprehensive grasp of their studies.

The second group of fifty-one represents those who have learned their lessons faithfully, but from lack of either ability or application have not shown that original grasp and thorough mastery of the subjects taught, which entitles them to first rank as scholars, and gives promise of preëminence in scholarly pursuits.

The third fifty-one includes those who merely drag through the course, cramming into their heads words and phrases enough to. to pass the examinations but acquiring practically nothing of value except such contagious germs of wisdom as they cannot help carrying in their clothes. By arranging the physical divisions in horizontal, and the scholarship divisions in vertical lines, I have shown how each division in physical development is distributed between the three scholarship divisions, and how each scholarship division is distributed between the three divisions in physical development.

SCHOLARSHIP TABLE.

		Div. I.	Div. II.	Div. III.		
Physical Development . .	Div. I. . . .	21	15	15	=	51
	Div. II. . . .	18	20	13	=	51
	Div. III. . . .	12	16	23	=	51
		51	51	51	=	153

This table shows the tendency of rank in scholarships to coincide with rank in physical development. The most frequent coincidence is that of third-class scholarships with third-class physical development, which occurs in twenty-three cases. Next in frequency is the union of first-class scholarships with first-class physical development, which occurs twenty-one times. The next in frequency is the union of second class scholarships with second-class physical development which occurs twenty times. Next comes the union of first class scholarships with second-class physical development, which occurs eighteen times. The rarest combination of all is that of first-class scholarship with third-class physical development, which occurs only twelve times; in a total of 153 students. To infer from this table that athletics are related to scholarship as cause to effect would be wholly unwarranted. These same men who are finely developed physically would have stood just as high in scholarship, had there been no intercollegiate contests in which to display their prowess.

What the table does show conclusively is that excellent physical development which is an indispensable condition of success in athletics, is also a favorable condition of success in scholarship. It explodes the prevalent fallacy that the mind and body of the student are in inverse proportion. It confirms by statistics what we all know from physiological psychology that mind and body stand to each other in closest correlation. The table is not an argument for highly competitive athletics ; it is an argument for the intellectual value of physical development.

The importance of physical education is theoretically recognized to-day in nearly all our colleges. We know that every intellectual act is accompanied and conditioned by molecular changes in the cells and fibres of the nervous system ; and that intellectual vigor and power is dependent upon adequate quantity and quality of blood to support this activity of nerve and brain. We know too that the combined influence of a trying climate, and the nervous strain involved in adjustment to new, complex, and rapidly changing industrial, economic and social conditions is overdrawing the vitality and nervous energy of our people at a rapid and ruinous rate. This strain is most severe upon the professional and mercantile classes, into which our students are very largely drawn. It is the duty of the college to send out its graduates physically equipped to stand this strain themselves, and to hand down to their offspring constitutions as good and strong as their own.

There is no danger that in theory the importance of physical education will be neglected. The danger is that this general theoretical recognition will not be followed up by vigorous practical application.

A great many of our colleges are simply playing with this problem. They build a gymnasium; place somebody or other in charge; and throw it open during a portion of the day. But there are no definite requirements; no specific program; no academic recognition; no sufficient incentive to make of physical education the same serious business as education in other branches. If under these conditions the results are unsatisfactory, the same thing would be true of political economy or biology, if its work were placed on the same loose and irresponsible basis.

Physical education is of sufficient worth and importance to receive the same intelligent and business-like consideration that is given to any other department of education in a college.

The building must be built and equipped for the purpose. The director must be a man of collegiate and medical training; proficient in physical exercises himself, and able to impart enthusiam for them to others: endowed with something of the military capacity, to command and manage men. And a man who combines these qualities should have the same academic standing and remuneration as the heads of other departments. Then the requirements of the students and the recognition of their work, should be as definite and systematic and dignified in proportion to its amount as work, in any other department.

If in many cases physical education has not justified the expectation of its friends, it is because it has not received the amount of enterprise, energy, patience and push, which anything must have put into it, if it is to succeed. Leave physical education entirely to the whims and caprices of the student body, and you must not be surprised if extravagance and excess are the result. Leave it entirely to the tolerance of an indifferent faculty, and what wonder that the exercises become a bore or a farce.

Enlist the enthusiasm of the student under the guidance of the faculty; combine the ardor of youth with the wisdom of maturity and it is perfectly possible to maintain a course to physical training that will give to every student, who is not hopelessly handicapped by heredity, a sound and healthy body to be the basis of a vigorous intellect and the instrument of a resolute will.

The expense need not be great. The course I have described is given in a building which cost, exclusive of apparatus only $10,000, and the annual expense of maintaing it including instruction, replacing of apparatus, light, heat and care is $2300, or $12.50 for each of our 185 students. A thorough course in physical training does not in the slightest degree interfere with the intellectual work of the college, but on the contrary is a decided help to both its mental and its moral life.

I do not expect or desire to see the specific details of the system I have described, adopted elsewhere. But that some system of thorough and general physical training is both practicable and profitable for colleges; that I want you to believe on the basis of our experience, and to work out to more complete demonstration in a wider and fuller experience of your own.

DISCUSSION.

Dr. Edward Hitchcock—I wish to speak heartily in favor of the paper just presented, and to say I am delighted that we have got another "American system." We have been talking about systems for a good while, and here comes in another. God bless every one that brings in a new one! I rejoice to hear testimony that compulsory exercises in colleges are possible In our fresh-water colleges, the smaller colleges where we have a number of men that we can reach, I think it is tolerably well established. I hope the rising sun will continue to rise until the Western colleges "catch on," as the boys say, and adopt some of these ideas.

There is another point I wish to be grateful for in the allusion to heavy gymnastic exercises. They have come to stay. We have got to meet them, and I am glad to do it. The general impression is that a good many of the students only play baseball and football, and have a good time; and the college papers are filled with accounts of the different ball clubs. All right. This is the result of the play instinct which keeps them active and interested. College boys need this, or something of this sort. But you say, only the strong are able to take these exercises. That is true. It is only the strong men who go into the teams. Very well. But these men are guiders, if I may use the term, of the others. It is not simply the elevens or the twice elevens, not the nines or the twice nines who feel the influence. The other students are interested, and also play games. They do not go into great contests. The strain comes upon a few men. The men trained for it are ready for it. They are picked men, and are strong enough to play, and to guide those of the puny fellows who like to play these games but are not strong enough to be tossed round by the bigger ones. That process reaches down, and I claim it as a good thing for our colleges. These weaker men do not expect to win in contests with Harvard, Yale, and Bowdoin, but they get their exercise. They stand on their heads and tumble round, and get good exercise. I wish to make this plea for athletics: We want gymnasiums, not for discipline with the teacher alone, but where the student can go in and stand on his head, if he wants to, and have freedom to do what he likes, if he has been guided and told what are the pernicious things to do. I am sure that we cannot manage college students unless we give them a great deal of that freedom.

Dr. Hall, Haverford College, Penn.—Haverford College puts physical training on a basis with other studies in the course, that is, with mathematics, Greek, etc. Failure to pass in gymnastics, if it is not made up, prevents a student from receiving a degree. It tries to fulfill the requirements that the President of Bowdoin has stated. We have military drill, training with Indian clubs, and exercises for the coördination of the mind and the body. We strive to get hard work out of our students Emulation is excited and the students practice at odd hours, and put in twice as much time as is required. I think we can present at least a good average in athletics. I think the minimum running high jump is four feet, and an average of four feet six or seven inches. All of us who have had any physical training in college are in sympathy with what President Hyde has said. Individual exercises are not out of date by any means. Our students get a great deal of good by working at weak points. I think much stimulus can be given to students by the system of measurements and working in this way, especially in large universities. But each man must decide for himself for his own work as instructor, and the small college cannot decide for the large one nor the large university for the small college.

THE GROWTH OF CHILDREN STUDIED BY GALTON'S METHOD OF PERCENTILE GRADES.

(*Abstract.*)

BY H. P. BOWDITCH.

In any statistical inquiry the average value of a series of observations gives but a very imperfect idea of the series itself, since two series differing widely in their range may have the same average value. To meet this difficulty the method of percentile grades has been devised by Francis Galton, Esq , F. R. S. The method consists in determining a series of values representing limits which are reached by various percentages of the total number of observations. The value which divides the whole number of observations into two equal values, *i. e* , the value below which one half, and above which the other half of the observations lie, is called the 50 percentile grade, and as a rule does not differ materially from the arithmetical average. The value below which 10 percent. and above which 90 percent. of the observations lie is known as the 10 percentile grade, etc., etc.

If observations are made upon the physical peculiarities of any natural group of objects as, for instance, upon the height of a number of individuals of the same age and nationalities, it will be found that the curve, the ordinates of which express the values at succeessive percentile grades, will be at the beginning concave and at the end convex toward the abscissa, while the greater part of the middle portion of the curve will not differ materially from a straight line inclined to the abscissa.

The application of this method to the study of observations made fifteen years ago upon the height and weight of about 24,000 Boston school children of both sexes leads to the following conclusions :

1. The period of accelerated growth in height and weight occurring just before the age of puberty, as revealed by a comparison of the average heights and weights at different ages, may also be observed when the values in successive years at any given percentile grade are compared with one another, but the period in question occurs earlier in the higher than in the lower percentile

grades. In other words, large children have their period of accelerated growth at an earlier age than small ones

2. The period during which girls are taller and heavier than boys of the same age, as shown by a comparison of their average heights and weights, exists also at the various percentile grades, but this period of female superiority occurs earlier in the higher than in the lower percentile grades. Superiority in height differs, however, from superiority in weight in the following respect that the former is more marked, both in amount and duration, in the lower and the latter in the higher percentile grades.

In other words, during the period of female superiority tall girls surpass tall boys in height less than short girls surpass short boys, while heavy girls exceed heavy boys in weight more than light girls exceed light boys.

Details of this investigation with tables and illustrative curves will be given in the next report of the Massachusetts State Board of Health.

A COMPARATIVE STUDY OF AVERAGE MEASUREMENTS.

E. HITCHCOCK.

After this learned paper, it is unwise to do much more in the way of talk about measurements. I shall spare you the reading of even a five minutes' paper, but I wish to thank Dr. Bowditch for such a lift as he has given to the matter of measurements. A great many people cannot see the use of so many petty measurements, and think it is nonsense. I should not have offered anything to you to-day were it not for two circumstances. Last fall the ladies in charge of physical education at Wellesley, Misses Hill and Wood, prepared an anthropometric table of women—if there is not a Hibernicism in that. To my mind it was a very valuable table. It included five freshmen classes. About that time Dr. Cotton, of Mount Holyoke College, made the same measurements, and at Amherst we have made the same measurements for a good many years. There was an opportunity to compare those measurements of like people, freshmen in college—men's and women's colleges. We had the endowment of a fellow-ship, which gives the time of a graduate for a year succeeding graduation to be devoted to physical education, study and practice. I was put in possession therefore of a young man, Mr. Frank A. Delabarre, who seems well adapted for this work. He has thrown himself into it, and has taken it for his pastime to correlate these tables and make certain deductions. They are not in the percentile form, but I offer them to you, hoping that you will take the trouble to carry them home.

It is the purpose of this paper to make a comparative study of the male and female figure as made from the examination of New England college students. The measurements from which the deductions are made, are the averages for five freshman years, compiled from statistics of about five hundred individuals, each, at Amherst, Mt. Holyoke, and Wellesley Colleges, between 1884–1889.

It is true that they are not data taken from fully developed manhood and womanhood, since the average age of each sex is approximately 19 years, and yet they seem to show that at this stage of the development of the human body, such conditions as will appear are true.

The stature of man is influenced by climate, occupation, surrounding circumstances, etc. ; races having their own distinctive characteristics. Likewise, different classes in the same race are distinguished from each other but not in so marked a degree.

Many of the fundamental differences in regard to figure, which distinguish the male from the female, are established by common experience and scientific investigation ; on these points our observation only corroborates such knowledge. For instance, in all the tests of strength, man is naturally the stronger as he is superior in the capacity of lungs. Such well known facts regarding the breadth of hips and waist are too well established to need any more than a passing confirmation.

Take first the matter of weight. One naturally supposes that the male weighs proportionately more than the female ; but such is not the case. The figures declare an almost exact correspondence, each weighing 1.9 pounds for every inch of height.

The fact that the girth of the female thigh actually exceeds that of the male, is doubtless due not to the muscular development but to the presence of fat. An interesting fact is brought to light in comparing the girth and breadth of head and also of the neck. The difference in per cent. in girth of the head in favor of the male is only .007, while the difference in breadth is .045. This would seem to show that the antero-posterior diameter in woman is longer proportionally than the transverse diameter. This is more markedly evident in the neck, which shows a difference of .077 in girth and of .166 in breadth. That is, a woman's head and neck are more oval in shape than the man's.

Considering next the height from pubes to sternum and figuring in this case from total height as a basis, it appears that the male is over 7% taller than the female, but in length of trunk he exceeds her by 11%. The same is true as regards the distance between the pubes and navel, the male being 12% longer here than the female and only 7% taller. This conclusion is contrary to the usual theory that woman has a proportionally longer trunk than man. In the length of the lower limbs there is a difference of 9% in favor of the male; but in the length of the head and neck the female actually exceeds the male by .009%. So the difference lies here rather than in the length of trunk, or lower limbs.

Humphrey, in comparing the human figure with that of the lower animals, says that "in man the segments nearer the trunk are comparatively lengthy; the more distal ones being comparatively short. Thus the thigh and arm are respectively longer than the leg and forearm," and "that the greater proportionate length of the thigh is one of the characteristics of the human figure." The result of this is, he says, "that strength is sacrificed to celerity and nicety of movement, as well as to a ready subservience to the will."

Leaving the lower kingdom and making the same comparison between the sexes of the human race it appears that the female follows out this same evolutionary progression to a greater proportionate degree than the male. Perhaps it was because she had the advantage of being last introduced, but more likely to give her the greater celerity and grace of movement.

The male is nearly 12% longer in the leg than the female and only 6% in the thigh. In the upper extremeties, however, the measurements almost correspond, there being only one per cent. difference in favor of the male.

Such are some of the most apparent suggestions presented by these tables. But they are here offered in the printed form to any persons who may desire to examine them more mitutely or give a different or more searching study to them. Compiled with them in the appended chart are certain

ANTHROPOMETRIC RESULTS.

When working for a result, we are much more successful if we can get it in more ways than one.

The Department of Physical Education in Amherst College has been looking after an anthropometric college standard for about twenty-five years. To this end thousands of student measurements have been made and tabulated, and progress published from time to time as a supplement to Gymnastic Exhibition Programs. About thirty of these statements have been thus issued, which were preliminary to, and have aided in the preparation of the tables on the following page. We want to learn what are the Physical Data of the Typical or Ideal College Student, and to do this we know of no better way than to observe every student whom we can lay our hands upon, put our measuring appliances upon, and secure all the measures which show the proportions of the "Average" or the "Mean" student. And from this standpoint we must, by labor and study, find out how much proper cultivation and healthy work can better this present average condition: find out how much and how fast we can *further develop the present student average body.*

The past history of the Human Race shows us that we have been led forwards and upwards by the influences which have been conceived and partially developed in the Universities and Colleges—the world over. And if the intellectual and spiritual forces are found there, may we not expect that the body, the earthly partner of the soul, will be fairly represented by these men. For as the College fills its ranks from all grades of society, from what other source can we get a more general or comprehensive group to work upon, or gain an idea of a more fair representation of our universal physical man, than from this source? Therefor we offer as the most desirable materials for this purpose, the young men of our colleges, who have attained their majority in age, and are mainly of American origin. And for the results of this paper we bring the measurements of about 2,000 students of Amherst College of the average age of twenty-one years and one month, in the tables on the following page.

The first column of these tables gives the observations of 2,000 students as showing the AVERAGE MEASUSEMENTS of the items designated. And by an average we mean the sum of all the measurements under each item divided by the number of the men observed, or as better expressed: "an average is obtained by dividing the sum of the values observed, by the number of observations."

But an average result is not entirely satisfactory. It does not assure us of the future since it is so much modified by the extreme values, those very large or very small. So that a more reliable method is the use of the DOCTRINE OF MEANS—the second table—rather than that of averages. And to quote again, "a mean is the value at which the largest number of observations occur, and it is obtained by arranging the men"—measures—" in groups, and noting the value of the group which contains the largest number of individuals." Thus for this student study 2,086 individual measurements were separated into groups made by the variation of a few millimeters each, and the group containing the largest number is the record of the table. And while in any study, averages and means always approach very nearly to each other, yet the central value, the real object sought for, is much more reliable if obtained through the doctrine of means rather than that of averages, because the result is not affected by extreme or exceptional cases.

To know the MEASUREMENTS OF THE MEN WHO ARE OF THE AVERAGE AGE OF ALL WHO ARE OBSERVED will certainly give additional light on the proportions of the physical pattern which we are to work from. The third table gives the average measures of 326 college men who were between 21 and 22 years of age.

There are thus presented here three distinct methods to help determine the pattern of the College Student. To these in due time it is hoped a percentile table may be added.

E. HITCHCOCK.

ship of departments. What the organization accomplishes is thus far more than the sum of what could be accomplished by a good gymnasium, a good school and library, and a strong religious society. It is as if these institutions were multiplied by, rather than added to each other. Thus the physical, intellectual and spiritual are as intimately blended in our work as they are in the constitution of the young man himself for whom we work.

This is the vital element which separates us from all institutions which work for but one of man's natures, and that one out of relation to the rest of the man, such as athletic clubs, schools and those religious societies which are purely spiritual in their aims. Thus our Associations are established on a natural basis, deep down in the very constitution of the man himself, and physical education is given a unique position of great dignity and usefulness.

Our endeavor is for true symmetry, not merely symmetry of body, symmetry of mind, symmetry of soul, but a symmetry of these symmetries, a symmetry of body with mind with soul.

I have spoken thus at length on this philosophical basis to our work because it is perhaps our most distinctive characteristic, and the one which argues most for the strength, vitality and permanancy of any department of it.

2. *What is the Character, Ability and the Training of the Leaders for this Department?*

This usually determines the fate of an organization. Our eyes are turned toward the present and future, not toward the past, for at first this department was not recognized as on the basis of which I have been speaking.

The field was largely occupied by two classes: (1) The professional gymnast, athlete, ex-sparrer or ex circus performer; (2) Those who by a few months of attendance at some gymnasium had secured a knowledge of the rudiments of the bodily movements. Neither of these classes, as a rule, made desirable physical directors. They both lacked the mental and physical qualifications needed in this field, and there seemed no other way to secure suitable men for this work than to train them for it.

The putting of physical education on the plane of which I have just been speaking has altered this condition of things and has rendered it necessary that the physical director shall be an earnest Christian man with a broad general education, as well as a definite theoretical and practical training in physical education.

As illustrating this change in the character of men demanded, during the last twenty months, I have received one hundred and twenty-nine applications for such men. Another significant straw is the rapid rise now taking place in the salaries that are offered in this department of our work. The physical department of our International Training School has been in existence but four years and yet already over 50% of the physical directors in the country have attended one or more of its sessions where these ideas are taught; this again illustrates the change that is going on, and it is these men who are in charge of the gymnasiums at the most important points; New York, Chicago, Baltimore, Cleveland, Buffalo, Washington, Kansas City, Milwaukee, Louisville, Toronto, St. Paul, Providence, Albany, Nashville, Richmond, Atlanta. It is also significant of the higher grade of men demanded, that this school has closed the doors of its Summer School to those who desire to enter the work with but one month's training and is only admitting new men to its regular courses, reserving its Summer courses for those who are already in the work and desire to still further perfect themselves. Twenty per cent. of the present students in the two year's course are college graduates, and the physical, mental and spiritual qualifications required for admission are being rapidly raised.

Another significant point in regard to the leadership in physical education in our Association is the fact that the embryo general secretary during the course of two years receives a practical training of an hour a day in the gymnasium or on the field and a course of four hours weekly, during one school year in theory of physical education with its bases, anatomy, physiology, psychology.

We are thus securing men for the leadership for this department of our work who are well trained technically, broadly educated, and who are entering the field from the same high motives and earnest purpose that actuate the missionary or minister.

3. *What is the Structure and Character of this Organization as a Whole?*

There are upwards of 4000 Young Men's Christian Associations distributed throughout the thirty-five most prominent countries of the world. These 4000 Associations aggregate a membership of 350,000, spend upwards of two millions of dollars annually, and have an equipment in this country alone worth over eleven millions.

The Association on this continent employ over twelve hundred men as general secretaries, physical directors, etc.

These figures are especially significant when we remember that the institution is not yet fifty years old, and is growing with a constantly accelerating speed and momentum.

The physical department is very young, seven years ago seven men were employed by it, since then the growth has been as follows, counting only the places which employed men in this department 7, 9, 35, 55, 80, 92, 121, 144. From 7 to 144 in seven years, a gain of over fifty per cent every two years, and no sign of abatement. The growth in gymnasiums has been still more rapid, now counting up to 348.

Not less than the size of this body and the rapidity of its growth, is its thorough organization. In the large cities there are several Associations which consolidate and form the City Association, each being a branch. The Associations in each state unite and form a State Association. The Associations of this country and Canada have also united and formed the International body and it is to the far sighted policy of this body known as the International Committee of Y. M. C. A. that the work in this country is on such a satifactory basis and in such a flourishing condition.

It has been the uniform policy of the International Committee to encourage scientific advance in connection with the physical department of their work. Anthropometric blanks have been prepared which were adopted by the secretaries of the United States and Canada in Conference at Grand Rapids in 1888. Thus uniformity is being secured in this regard. These uniform measurements are being returned to the International Committee who are having them tabulated, the results to be given to those Associations who have entered into the plan.

The size of the Association and its varied membership affords perhaps better opportunity for study of the effects of the trades on physique, comparative physiques in different parts of the country, and in different countries, than is offered to any other body. As it is such a large body, however, it will take a considerable time to get the necessary machinery into working order.

For the last five years I have spent a considerable portion of my time as the agent of the International Committee, for the physical department of their work. The fact that they have employed some one in this capacity illustrates the practical interest they are taking in this work of physical education.

In closing—the unique and important place given to physical education by our Association; the thoroughly trained, earnest leadership that is being raised up; the great size (350,000); financial ability ($2,000,000 a year); rapid growth; geographical distribution, being in every civilized country; and its thorough organization, all of which point to the Young Men's Christian Association becoming one of the great factors in the physical education of the world.

DISCUSSION.

Dr. Smith—It is sometimes thought that physical training in Young Men's Christian Associations is a sort of a trap to catch the men. But the associations desire to raise the standard of physical education till it is equal to that furnished by the colleges, to make it educational, a physical ministry. The gymnasium is one of the threefold works of the associations, work for the body, mind and spirit. The result aimed at is the perfect all-around man.

Adjourned.

Evening session, 8 o'clock.

"ATHLETICS *VERSUS* GYMNASTICS AT HOME AND ABROAD."

(*Illustrated by lantern views.*)

BY E. M. HARTWELL, M.D.

I hardly propose to dignify what I have to say by applying the title of 'paper' to it. My purpose is to call your attention to some of the striking features of athletic sports and gymnastic drill as we find them organized in Europe and in this country, and also to call your attention to some of the institutions, which are well provided with gymnasia and play grounds.

There is a sharp and clear distinction to be drawn between athletics and gymnastics, which is implied in the very words, which are of Greek origin. This distinction was made in the Grecian period, athletics implying even then a contest or sport, while gymnastics meant more particularly discipline or drill. Agonistics, athletics and gymnastics, all these had their starting point in the games of children. In general we may say that the same class of games which children play now were playad by Greek children. They were ball, quoits, tag, blind man's buff, odd or even, and games of that sort. We find traces of the same games among the Romans, and also among the nations of mediæval times. The gymnast was the trainer, the athlete was the one who played the games. There was another class of trainers who superintended the individual contests. The Gymnasiarch was the superintendent of the Gymnasium, and had general oversight of the trainers, the contestants and the exercises preparatory to the contests. His aim was to secûre symmetrical and harmonious development of the body as a whole and of its single parts, to base athletics on gymnastics in other words. The first mention we find in history—if we may call Homer history—of sports among the Greeks shows that they were called āthlā, from which theword athlete comes. The most circumstantial account of them is found in the twenty-third book of the Iliad, in the description of the sports, instituted by Achilles at the funeral of Patroclus, in whose honor they were held. They were played for objects of value, female slaves, horses, oxen. Some seven different sports are mentioned, among them chariot racing. Chariot racing is much older than the races of men on horseback. They drove horses, but did not ride them in early times. They had boxing, running, contests with sharp weapons, throwing discs or quoits, casting of weights, shooting with the bow and arrow, and throwing the spear. The sports retained their primitive features longest in Sparta, where more attention was devoted to bodily than to mental education. The general, broad view of education in accordance with which provision was made also for the mental education of the young men on the part of the State trainers, was most highly organized in Attica. In no country before or since, that we know anything about, has bodily training entered so largely into the national training and so affected individual national life—as revealed in poetry, philosophy, art and religion.

It was an indigenous growth from Hellenic soil. It developed out of the sports I have spoken of. It came to be seen that these contests could be made use of for the thorough education of the man. Bodily training was reënforced by mental training and the mental training reënforced the bodily, and so there grew up a complete human training. Then came the most flourishing period of the Grecian state. When the conquerers came, the gymnastic art fell into decadence, athleticism succeeded it and the contests became rough, mercenary, and vainglorious. The athletes went about from market-place to market-place, from festival to festival, contending for the prizes which they could get. Milo, one of the most famous athletes, is credited with having won from twelve to fourteen hundred victories in national games, or local contests. Astounding stories are told of his strength and endurance. The rise of professional athleticism was noted and criticised by Aristotle and Plato, and by Greek poets and physicians also. Ridicule and exhortation were urged against it in vain. Athleticism culminated in the bloody sports and brutal games of the Roman arena.

It is interesting to note that the sports of the gymnasium and the palestra formed a part of the distinctively public education regarded by the state and were considered indispensable means of training every free born man to become a good soldier and a good citizen. It was the prerogative of the free born of the gentry to be so trained, since the lower classes were shut out entirely from the games.

The Romans were hard-headed, practical men, who did not take to the idealism of the Greeks. So far as they adopted physical training as an educational factor, it was of a private nature. In many palaces were gymnasia, tennis courts, ball courts, baths and other means for keeping themselves in health. They adopted certain exercises of the body, but they were not social, nor distinctively national. Those that were practiced in public were often of a bloody and brutal character, as the gladiatorial sports.

Training in the middle ages was chiefly mental and in the hands of ecclesiastics. The training even of the knights and warriors, so far as it was mental, proceeded along lines laid down by the clergy, after methods fashioned by them, and with materials which they provided. It was a technical training, chiefly devoted to training men for clerical functions of one sort or another. The science and literature made use of in their training was employed chiefly for mainly technical ends. The training of the sons of the nobles, even the training for court life which supplemented the mental training they received from monks or chieftains, was not for general purposes. Even the knightly, bodily exercises may also be called technical, they were chiefly a means of prepparation for actual or mimic warfare ; to become a knight one must serve first as page and then as squire. The knight took his degree in chivalry according to a semi-religious ceremonial, and was then recognized as a gentleman worthy to appear at court, and capable of bearing arms and fighting under and near his lord.

Athletics in modern times have sprung up, as they did in ancient times, through the ineradicable impulse of children to play, to contend in friendly rivalry, and engage in trials of strength, We find athletic sports more nearly assuming the proportions of a national institution in the British Islands than anywhere else, where individualism is most fully developed, and individual initiative has fullest play. The English schools are as individual and peculiar in their ways and fashions as are English athletics. British schools and British sports differ from similar institutions on the continent in most points. British physical training is chiefly of the athletic sort. Most of the games now in vogue in Great Britain were once tabooed as vulgar.

It is interesting to note that modern gymnastics, which have been given a prominent place in most reformed educational schemes, since the humanistic movement which led to a revival of the study of the Greek language, have been adopted for reasons quite unlike those which underlay and shaped their development of ancient Grecian gymnastics. They have been brought in for the purpose of training the body it is true ; still more for the purpose of counteracting the effects of urbane and sedentary life, and to provide an offset to undue or brutal study. This is an idea which was not common or usual among the Greeks, the Romans or the men of the Middle Age. It is true, however, that gymnastic measures constituted a considerable part of the ancient medical art, and that their decadence was partly due to the substitution of medical prescriptions for the hygienic procedures which such physicians as Hippocrates and Galen had approved and employed. Our modern predilection for drugs and nostrums has resulted rather from Arabian than from Greek influence and teachings. Through a wise regulation and combination of athletic games and gymnastic training we may do much to restore hygienic practices to their ancient high estate.

With this brief introduction I shall invite your attention to a series of views which I shall show as suggestions for further remarks.

Dr. Hartwell then showed a series of stereopticon views of gymnasia and play grounds in Europe and America, including representatives, both of ancient and modern types; adding in conclusion that though the buildings and appliances in this country are often more elaborate and costly than those in Europe, the results attained abroad are usually more considerable and worthy of praise.

USEFUL ANTHROPOMETRY.

BY FRANCIS GALTON, F.R.S, 42 RUTLAND GATE, LONDON, ENGLAND.

So much labor is being applied to Anthropometric observation in various American Colleges, that we may appropriately consider whether it is employed in the best possible direction, and to what really valuable results it is likely to lead. It is a human frailty to which statisticians are eminently liable, to look upon means as ends. They learn to take keen pleasure in the mere accumulation of neatly tabulated figures, carefully added and averaged, quite irrespectively of any use to which those figures can be applied. They are like money makers, who spend their lives in piling up wealth for the pure pleasure of doing so, as if wealth were an end in itself, and not a mere instrument for making life more full, more useful, and more bright.

It seems to me high time to consider with much deliberation, what varieties of information the data already collected at American colleges are capable of affording, and judging from the title of the Association to which I have been invited by your Secretary to contribute this brief memoir, I imagine that it might perform important service in doing so. A working committee of really capable statisticians might lay down reasonable, and business like lines of investigation, having strict regard to the quantity and apparent quality of the data to be dealt with, these would embrace the effects of race and those of environment upon development; correlation of the bodily dimensions, etc., variability, and normality of distribution. The last mentioned subject deserves a few further remarks. It should be regarded as a golden rule in statistics that no group of data can be homogeneous and therefore suitable to be dealt with, unless their variability is approximately of the normal type; that is to say, conformable to the law of "frequency of error." When the variability is not normal we may feel assured that classes of data are included in the same group that ought to have been treated separately, and that require to be disentangled before useful statistical results can be achieved. On the other hand, whenever the variability is fairly normal, we know that the variations of the individuals are due to a multitude of petty causes, while the exceptionally inportant influences are felt by all. In other words, the group is homogeneous, and its statistical discussion may be proceeded with, in security from gross blunders.

An inquiry such as I have ventured to suggest, would probably show that many classes of observation might for the future, be dispensed with. A very great deal of work has to be done, and the principle of economy of effort exacts that, when a sufficiency of any class of observations have been collected, their further accumulation should cease.

The inquiry might next be extended to new objects of investigation, of a kind that the imperfect character of the present observations render impossible, and to determine the minimum of additional data that would be required. I would ask to be permitted to suggest a subject, or rather a very interesting class of subjects that fall under this head. It is to investigate the best method of assigning marks for Physical Efficiency, based on anthropometric test. This is already becoming a practical question in England, and I trust will be thought of no less importance in other countries. A serious movement has just been instituted, to establish a system of assigning marks on these grounds, in competitive examinations for those government posts in which high physical powers are especially desirable. The existing examinations for all such posts, are of a purely literary character. It is true that there is a subsequent pass examination to weed out those who are quite inefficient physically, but so long as the mere pass ordeal is successfully got through, the possession of bodily powers above the average, does not help a candidate. It is desired to reform this rather absurd and pedantic system, in the examinations for entrance into our Army, Navy, and Indian services. I brought the subject before the notice of the British Association last autumn. It was provisionally approved by them, subject to confirmation after leisurely investigation by their Council. This has taken place, and I enclose a printed copy which has reached me this very day, of the circular which they have addressed in suitable covering letters to the heads of the great department of state just mentioned, in the name of the British Association. I cannot express my meaning clearer in a few words than by submitting this circular, which without reprehensible breach of confidence, I may say, that I drafted myself:

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

22 Albemarle Street, LONDON, W., March, 1890.

The Council of the British Association for the Advancement of Science desire to submit the opinion expressed by the Anthropological Section of the Association last year, and subsequently confirmed by a Committee appointed by the Council, of the feasibility of assigning trustworthy Marks for Physical qualifications, and briefly to state some of the reasons for that opinion.

They feel it to be unnecessary to dwell on the desirability of including such marks in the examinations for entrance into services where high physical powers are important, but would merely allude to the fact that it was fully recognized by the War Office in 1878, at which time a joint Committee of the War Office and of the Civil Service Commissioners was appointed to inquire into the question "whether the present literary examinations for the army should be supplemented by Physical Competition." Also that it was agreed to almost unanimously by the various speakers in the House of Lords in connection with that report, on May 21 and June 7, 1878, and on February 28, 1879. (*See* Hansard for those dates, pp. 352, 1328, 1941.) The report was presented June 28, 1878.

The recommendations of the Joint Committee referred almost wholly to marks to be assigned for athletic performance. Objections to this method of examination were, however, pointed out by some of the witnesses; they were appreciated by the responsible authorities, and were strongly insisted upon by them in the concluding debate. These objections applied principally to the costliness of the necessary preparation, to the difficulty of conducting the tests, to the additional strain they would impose on the already severely-taxed energies of the candidates, and to the interference of physical training with due preparation for the literary examinations. The consequence was that the recommendations of the Committee were not adopted by the responsible authorities, and the subject was laid aside.

The Council of the British Association now desire to point out that, in the opinion of Anthropologists, athletic performance is by no means the only basis upon which trustworthy marks for physical qualifications may be assigned.

This opinion is confirmed by some experiments made at Eton College, of which an account was submitted to the British Association. Thirty-two youths, most of whom were candidates for the army, were inspected and marked by two medical men, sitting in separate rooms. The medical men had previously received the same general instructions, but otherwise acted independently. The marks they severally assigned to the youths were afterwards found to agree with considerable precision. Then, nineteen of these youths were set to write an English essay, and their performances in that respect were submitted to two examiners in turn, to be marked independently by them. The marks given by these examiners agreed together only one-half as closely as those given by the medical men. No one disputes the substantial trustworthiness of such literary examinations as these, however much they may be thought capable of improvement. But this experiment (so far as it goes) proves that the trustworthiness of physical examinations would be still greater.

The difficulty of formulating a system for the use of inspectors, according to which marks should be assigned on a common and easily understood principle, is greatly lessened by the use of anthropometric tests. Much experience testifies to the quickness and adequate precision with which the chief elements of physical efficiency admit of being measured. These are the breathing capacity and the strength, both of them to be regarded with reference to the stature and to the weight; the rapidity of muscular action; the quickness of response to a signal made either to the eye or to the ear; the keenness of eyesight, and that of hearing, and whether the colour-sense is normal or not.

An experiment made at Marlborough College, which has just been published, shows how small may be the difference between the class-places determined by these measures and those determined partly, in some cases, by the physical aspect, but principally by proficiency in the various school games, or, in other words, by athletic competition. Seventeen youths were measured by such apparatus as was then available at the College, and copies of their measures were distributed among the masters, to be marked by them on whatever principle they severally thought best. The individual results proved to be very discordant, but their averages, which express the result of the aggregate common sense of all the masters, ranked the boys in closely the same order as that independently assigned to them according to their proficiency in the various school games and to their apparent physique. It will be observed that if the masters had previously conferred and come to a mutual understanding on the principle according to which the marks should be assigned, they must necessarily have arrived at identical results, as they had definite and identical data to work upon. There happened to be one case of failure, which was instructive. This was due to the absence of any test at the College for rapidity of muscular action, or of promptness of response to a signal. The consequence was that an agile youth was rated too low.

The Council would point out that the experience gained by the measurement of about 2,000 students at Cambridge conclusively proves that success in literary examinations is in no manner connected with stature, weight, strength, or breathing capacity, and but slightly with keenness of eyesight. Such differences as there appear to be in these respects between the men who obtain high honours and those who take an ordinary degree are small, and can be accounted for. Successful literary men have probably great nervous energy, perseverance, and great power of concentrating their efforts, which would cause them to utilize such physical powers as they possessed with much effect, but they are shown to be neither superior nor inferior in the above-mentioned particulars to those who fail.

The Council of the British Association have noted with pleasure the opinion expressed by the Civil Service Commissioners in their Report of 1889 (xxxiii. p. 15), to the effect that they anticipate no greater difficulty in ranking candidates according to their physical, than according to their literary qualifications. The Council thereupon beg to express the views at which they themselves have arrived, as follow:

It seems to them that the paucity of available data makes it scarcely possible at the present moment to elaborate as complete a system of assigning marks for physical qualifications as is desirable, and as, in their opinion, would be otherwise feasible. They therefore think it very important that suitable steps should be taken to obtain these data. For instance, if a temporary system of marks were tried, with the avowed determination of reconsidering the subject after some experience had been gained, the desired information would rapidly accumulate in the hands of the inspectors, the attention, of schoolmasters would be strongly aroused, and it is probable that they would attempt a variety of experiments analogous to those alluded to at Eton and Marlborough, but on a much larger scale. In a very few years it might then become feasible to arrange a system that should be generally acceptable.

In furtherance of these views the Council of the British Association beg to submit the following recommendations:—

(1) That an inquiry should be held as to the best system of assigning marks for physical qualifications, on the double basis of inspection and anthropometry, with a view to its early establishment as a temporary and tentative system.

(2) That the marks to be given under this temporary system should be small, so as to affect the success of those candidates only, who would be ranked by the present examinations very near to the dividing line between success and failure, and whose intellectual performances would consequently be nearly on a par, though they would differ widely in their physical qualifications

(3) That a determination should be expressed to reconsider the entire question after the experience of a few years.

The colleges of America would greatly help in a good cause by working on the general lines suggested in this circular. I see no reason why a man's physical efficiency should not be valued in terms of a simple number of marks, awarded on a well understood system. Nor do I see any reason why an employer in making his selection among many candidates, should not hereafter at some no distant time, be influenced in favor of that candidate who possessed a certificate of having been awarded high marks. Man is a machine of flesh and bone, and a good machine of any kind is worth more than a bad machine.

Dr. Gulick moved that a vote of thanks be given to Mr. Galton.

DISCUSSION.

Charles R. Greenleaf, M.D.—Before that vote of thanks is passed I should like to say a few words commendatory. I do not know how this matter strikes civilians, but this paper contains one of the most important suggestions for improving the efficiency of our army that has been made. It may remove the physical inefficiency of many of our officers who graduate from West Point. It is true that we examine candidates for admission to West Point, physically. We also examine the graduating class before they are commissioned as officers. But there is a good deal in the personal equation of the medical examiners and the distance in time between the examinations is four years, and points that one officer might notice at the entrance are possibly overlooked at the graduating examination. It has been a matter of considerable discussion as to how we could reach the actual physical efficiency of the men. Under our present retiring laws, an officer who is found physically disqualified to perform the duties, is segregated from the active list and placed on the retired list with three-quarters pay. When that occurs to one who has been thirty or forty years in the service of the government, it is believed that that is a reward for long and faithfully serving the country, but when it is given to a young man who has been but two or three years in the military service, and who is disabled because of a defect existing before he was commissioned, you can readily see that the question assumes a considerable importance. This suggestion strikes me as being the most effective way of solving the difficulty. I therefore trust that this Association will forward to the Secretary of War a copy of this paper with its favorable endorsement, for his consideration, for I am sure he will be grateful to you for bringing to him something that will solve the difficulty that I know has worried him a good deal.

Dr. Sargeant.—We shall have a paper to-morrow morning by a pupil of Mr. Galton, when we shall hear more of this. The important part of this matter to my mind is the desire of coöperation with those in America engaged in this work, and I see in that also the coöperation which we may get from England in regard to our measurements and the possibility of our adopting a uniform system which will give importance and dignity to our work. I think the Association can well afford to congratulate itself upon a paper from so distinguished an authority as Francis Galton, best known as the author of "Hereditary Genius," and more recently as the author of that most remarkable work on "Natural Inheritance," and "Inquiries into Human Faculty" Mr. Galton with others, is carrying on a series of experiments which are going to throw great light on the origin of human faculty, a thing the schools have been grappling with for ages and upon which very little has been accomplished.

The third session was opened on Saturday morning at ten o'clock.

PHYSICAL TRAINING IN THE U. S. ARMY.

LIEUT. COL. CHARLES R. GREENLEAF.

It is a popular belief that our professional soldiers (those of the Regular Army) are men who should be regarded as typical examples of the good results of physical training ; this belief being in accord with an ideal that has been formed from the known requirements of a soldier's life, the supposed care in his selection, and subsequent special instruction ; and it is inferred that, inasmuch as a part of his professional duty is to endure the hardships of campaigns in every variety of climate, and to encounter active enemies with many possibilities of personal combat, he ought to be a model of physical perfection. Entrance into the Army is guarded by medical experts, who examine applicants for enlistment with great care, discarding all who bear physical blemishes and accepting those only who, so far as the keen senses of experts can discover, are "free from bodily defects." After enlistment accepted candidates are subjected to rigid discipline in their habits of life ; they rise and retire at regular hours ; their food is carefully selected and properly prepared ; their clothing is well adapted to the protection of their bodies ; they sleep in apartments that are usually well heated and ventilated ; and they are exercised daily in drills and other military duties. Notwithstanding all these hygienic advantages, the regular soldier cannot be regarded either as an athlete or even as a well trained man physically. There has been omitted from his military life that instruction which is essential to an equable and physiological development of the body ; his systematic gymnastic training, or if you please, his *general physical culture*, has been neglected. Having but one object in view, his training has been confined to the single direction of military exercise ; and this having no break or variety of motion, becomes tiresome, is done in a perfunctory manner, and, failing in its hygienic function, leaves him overtrained in certain anatomical regions, expert only in specific muscular actions. and generally but little better off physically than when he entered the service ; certainly in no sense fitted to fill the *role* of a typical athlete. That this is no fault of his, is evidenced by the traditions of frontier life in early days, which teem with accounts of swimming matches, boxing bouts, foot races, etc., voluntarily engaged in by the men, while serving a monotonous enlistment at remote stations, years before the advent of railroads and other elements of civilization. This desire for athletic sports was recognized by their officers, who fostered it by every means in their power ; and although I am unable to find any record of the formal presentment of this matter to the military authorities, I have many times in my early service heard old officers, veterans of the Mexican and Indian wars, relate their experiences and express the opinion that nothing would conduce so much to the benefit and the contentment of the men as the establishment among them of well equipped and properly-conducted gymnasia, and the encouragement of athletic sports.

The introduction of the long-range and rapid-firing weapons with which the soldier is now armed, and the consequent tactical changes from the massing of troops when the "elbow touch" was an aid to courage, to the dispersed firing line of a modern battle-field, has developed his individuality and led him to feel the necessity for physical activity and endurance in attacking an enemy or in defending himself. His interest, therefore, in the means which will insure this end is very great ; and the universal testimony of officers who have been detailed to conduct the athletic exercises recently introduced into the Army is that they are the most popular of any among the daily duties of the soldier.

As in civil life we look upon institutions of learning as educators of public opinion, so in the Army we turn to the Military Academy at West Point for a similar object, and the history of our subject can only be written by noting the events at that institution which have led to the present status of physical training. The first official suggestion for the physical training of cadets was made by Surgeon H. L. Heiskell, acting Surgeon General of the Army. In a letter to the honorable Secretary of War, July 13, 1842, on the subject of the physical examination of cadet candidates, he wrote as follows :

> Might not a regular system of gymnasticks be adopted in connection with the usual academic course, which would prove eminently advantageous as well to the cadets as to the service ? This suggestion is thrown out with much deference to the opinions of those whose experience may lead them to a different conclusion. It is formed, however, not without due reflection and some opportunities of witnessing the injurious effects of the long and continued application of the mental faculties on the constitution of the graduates. The length of time devoted to close study is about ten hours *per diem*, and must necessarily debar the cadets from that amount of physical exercise absolutely essential at their period of life.

This suggestion does not appear to have been favorably considered, although the recommendation of the doctor as to the details of a physical examination were adopted, and remained in force until 1887. There is no further record of action looking toward the introduction of "gymnasticks" until July 22, 1858, when Colonel R. Delafield, superintendent of the academy, wrote as follows to the Secretary of War :

> I considered the moment favorable for attempting a remedy of some of the difficulties, and appointed Lieutenant J. C. Kelton, instructor of small-arms, desiring him to draw up a systematic course, * * * basing the whole upon the military gymnastic exercises as taught in the army schools at Paris and Vienna.

As the Lieutenant Kelton thus mentioned (now the Adjutant General of the Army) had a natural taste for gymnastics, and was somewhat of an athlete, he appreciated the necessity for improving the physical condition of the young men under his charge, and applied himself with energy to this task. Although his difficulties were many and the materials for work were scarce, he formulated and presented to the superintendent the following programme, which was adopted, and thus became *the first regular course of instruction in physical culture at the academy :*

PROGRAMME OF COURSE (GYMNASTICS).

First year.

Calisthenics, consisting of (1) suppling of the neck, arms, body and legs, without instruction; (2) use of clubs, dumb-bell, etc.—one hour each day, from June 1st to July 1st, and from November 1st to April 1st.

Swimming, July 1st to August 10th—one hour on alternate days.

Bayonet exercise, fencing.

Second year.

Gymnastics, November 1st to April 1st—one hour each day.

Swimming, June 20th to August 1st—three-quarters of an hour on alternate days.

Target practice and fencing.

Third year.

Gymnastics, October 1st to April 1st—one hour on alternate days.

Swimming, June 20th to August 1st—one hour on alternate days.

Target practice and fencing.

Fourth year.

Gymnastics—one hour each day from September 1st to June 1st. alternating with swimming, target practice, and fencing.

The gymnastics should be accessible to cadets during the encampment and during all hours of release from quarters. It would be desirable that they receive regular instruction between the months of November and April, between the hours of 4:30 and 5:30 p. m.

In April, 1859, Lieutenant Kelton went abroad on leave of absence "for the purpose of studying in the best schools of Europe the physical education of young men," and in 1860 made a report upon the subject to the chairman (Jeff Davis) of the Congressional committee on the organization, etc., of the Military Academy (pp. 217–218), which was the most complete of its kind submitted to that body. Other reports made by officers on duty at the academy referred favorably to the introduction of gymnastic exercise.

May 14, 1860, the superintendent, in submitting a programme for the use of this committee, suggested a limitation of the course to the first year, but the committee in its report recommended "gymnastic training during the first and second years of the course, and riding during the remaining three years." No further reference to the subject appears until, in 1869, the inspector of the academy called attention in his report (pp. 26–27) to the necessity for more instruction in hygiene and sanitary principles. This was reiterated in the reports of the several Boards of Visitors in 1870 (p. 12), 1875 (p. 12), and 1879 (p. 9). In 1881 the board reported as follows (pp. 7 and 12):

> There was no exhibition of exercises in the gymnasium; * * * the whole furnishing is unsatisfactory. A more suitable room is needed. * * * In fact, we find that no instruction whatever is given in swimming, and but very little in gymnastics. * * * The value of this class of exercises for men whose profession requires good physical development cannot be doubted. * * * We therefore recommend that all this class of instruction and practice be made a positive requirement; that this department be entirely reorganized and provided with efficient teachers. * * * The exercises should be conducted under the advice of a surgeon skilled in such matters; not for the purpose of stopping the exercises for fear of accident, but to direct them to the proper physical development of each individual (p. 7). The gymnasium room is not suitable for the purpose. * * * A building for the gymnasium is needed. * * *

In 1882 the board recommended that the erection of a swimming bath be authorized, and that the surgeon give lectures on hygiene, etc. (pp. 4 and 6), and in 1883 it urged the erection of a building for a gymnasium (p. 5).

Next year, it reiterated its recommendation for a gymnasium, and referred to a bill then before Congress for this purpose. It also published a table of physical measurements of the cadets so far as recorded (pp. 8, 21, 32, and 36). In 1885 it recommended an appropriation of $30,000 to build a gymnasium (p. 7), and in 1886 and 1887 made more or less extended reference to the same subject. In 1888 it recommended an increase of the sum necessary for the building to $100,000, which amount was finally appropriated by Congress, February 12, 1889, and the building is now in process of construction. During all these years this branch of study made slow but steady progress, until it reached its present state of efficiency under the care of Mr. H. J. Koehler, the swordmaster of the academy, of whose work the Board of Visitors in 1889 reported as follows.

> We confess that it was exceedingly difficult to believe that the gymnastic exercises performed by the fourth class could be the result of only one year of practice under instruction by Professor Koehler. The feats of agility were simply wonderful; they are

valuable chiefly as evidences of sound, muscular, trained bodies. It appears to be a loss that the cadet is allowed to elect his training after his first year in the academy. If continued exercise after the first year must be voluntary (which we deprecate), it would seem that it were well to place a premium in some way upon continued devotion to the gymnasium. Professor Koehler is an accomplished teacher.

It also publishes in the same report (pp. 111–115) the system of calisthenics devised by Mr. Koehler and used by him in his course.

The following extract from a letter addressed to me by the present superintendent, in reply to certain inquiries made, gives in brief the present condition of gymnastic training at the academy :

Physical training by calisthenic exercises forms a part of academic curriculum. They are required in the gymnasium between October 1st and May 31st of the first year, but are afterwards voluntary. During the second, third, and fourth years of cadet life they are continued in the riding-hall in exercises and gymnastics in the school of soldier mounted, as indicated in the pamphlet herewith (by Captains Godfrey and Augur, U. S. Army).

Besides the military drills and the calisthenic exercises described on page 111, *et seq.*, in the report of the Board of Visitors for 1889, cadets receive instruction in military gymnastics. These gymnastics may be defined as such simple exercises and combinations of exercises, arranged progressively, as tend to develop muscular strength, activity, grace and agility, and in which the danger of over exertion and injury are reduced to a minimum. They are performed by a number of men simultaneously, each exercise or portion thereof being executed at command. They embrace the exercises on the usual gymnastic apparatus, the clubs, dumb-bells, the various wands and iron bars, calisthenics, jumping, running, gymnastic contests, etc. Besides these, instruction is given in fencing with foil, broadsword and bayonet, and in swimming ; during the months of July and August daily instruction is given in dancing.

The calisthenic exercises published in the report of the Board of Visitors for 1889, are but a small portion, about 15, of that many hundred used in the gymnasium. The present system was introduced in 1885, and has been gradually improved.

The physical measurements and tests show marked average gains at the end of the first year's work of each class in weight, wrist measurement, forearm measurement, upper arm extended, and also with biceps set, chest inflated and normal, and in tests with horizontal bar, parallel bars, and broad jump.

The average duration of each lesson to the 4th class (first year as cadet) is 45 minutes.

Occasional sprained ankles are the only accidents occurring during exercises in gymnasium. About two years ago a cadet, while exercising "at will," attempted a feat not included in the regular course and broke his arm.

When we consider that the 4th class averages annually about 100 men, thus making 600 cadets in all in six years, who have received instruction three times each week for eight months and executing during this period about twenty exercises daily, we find a grand total of about 1,200,000 exercises since 1885, without an instance of serious injury or accident. We are therefore confronted with a marvelous record, the correctness of which is shown by the hospital books.

To one unacquainted with the physical training cadets receive, the foregoing gives but a faint impression of its value and thoroughness. There is no immediate supervision of the physical training of cadets by medical officers, and the experience of the last six years, in my opinion, shows such supervision to be entirely unnecessary.

* * * * *

The enlisted men at the post of West Point have no gymnasium ; their time during the day is fully occupied, and although what is commonly called "physical training" would be advantageous, and it is hoped will eventually be introduced, it is not deemed absolutely necessary in view of the continued physical labors these men are called upon to perform in the discharge of their legitimate duties.

The result of these efforts on the part of the academic authorities has been to awaken in the minds of a large number of officers an interest in the subject of a general physical training. These officers, appreciating the advantages of the instruction they had received, and the necessity for imparting it to the soldiers under their command, have encouraged and in many instances personally assisted in introducing such exercises and sports among the men as the limited means and apparatus at their command would justify. Some monographs have been published and many well-written articles from the pens of Army officers have appeared in the magazines, journals, and newspapers of the country ; advantage has also been taken of official reports to call the attention of the War Department to the subject, the Inspector General's Department, early in 1881, having record of a report made by Colonel J. C. Breckinridge (now the chief of that corps) which has been followed by many others of equal interest from officers in that department.

Clubs for conducting athletic sports have been formed at many military posts, and their expenses met by contributions from officers and men. Speaking of a series of games arranged by the Non-Commissioned Officers' Athletic Club of the 7th Cavalry, Major J. P. Sanger, inspector general, says—

> The money paid in prizes was contributed by the club members. All the performances were interesting and conducted with decorum and spirit, and I can do no less than commend highly the efforts of the non-commissioned officers of the regiment, especially Quartermaster Sergeant Campbell, in establishing this club and in exciting a general interest in athletic sports. The regimental and post commander, Colonel Forsyth, has set apart two rooms for the use of the club members, who, I learn from Quartermaster Sergeant Campbell, the president, now embrace among their number every non-commissioned officer of the regiment but three. The officers of the regiment, without regard to rank, have supported the efforts of the club, which, among other appurtenances, has a uniformed base ball club, a half mile race track, provided with a grand stand, judges' stand, and band stand, suitably ornamented and built by the club members out of hours.

There is a good gymnasium and bowling-alley connected with the canteen at Fort Townsend, Washington.

Post and department commanders have encouraged these sports, and in some instances have enjoined upon their officers an active assistance in their advancement. Major General Nelson A. Miles, who has for many years taken the deepest interest in this matter, writes to me as follows:

> I first started a system of gymnastic exercises by having regular daily drills of the entire command at Fort Leavenworth in the winter of 1874–'75, with six companies of infantry. The result was very beneficial to the health and strength of the command, and was fully demonstrated in the splendid service of the command in the field the following summer, especially in their marching qualities. I have followed it up at various times since in the Department of Dakota, the Department of Columbia, and the Division of the Pacific, as will be seen by the inclosed. I am fully convinced of its importance to the health, efficiency, and strength of the military service.

In 1884 he wrote as follows to the commander at Vancouver Barracks, Washington Territory:

> The military gymnasium will be ready for use on the 20th instant. Much skill and great care have been exercised in the preparation of the building, and it is the desire of the department commander that the course of instruction prescribed may be such as will result most beneficially to your command. This duty can be made either injurious to the enlisted men or of great benefit,

depending much upon the care and attention of the company officers and the interest taken by the individual. Hence it should be prescribed regularly and systematized, in order to avoid permanent injury arising from unwisely selected and rashly executed exercise, or the development to an abnormal degree of any particular part of the body.

The instruction should be made with a view to instituting a practical and useful athletic exercise, the main object being to render the soldier as nearly physically perfect as possible. It should be made a study and duty, as well as a diversion and pasttime—employed to invigorate and refresh the system.

There should be a record book kept in each company, and an examination made each month by the medical officers, with a view of ascertaining the progress made, discovering the neglected parts which need strengthening, and instituting such course in each individual case as will tend to gradually develop and perfect the entire system to a sound and healthy condition.

In his arduous duties the soldier needs all possible strength; for he cannot properly perform the duties required of him when physically weak and unsound.

The drill hours for the companies should be between 9 and 12 o'clock a. m., five days of each week, and the other duties so arranged as to include all the men possible for this gymnastic drill.

This duty is intended mainly for the winter, late autumn, and spring months, when the regular field drills and summer marches are not required.

In the afternoon, between 1 and 3 o'clock, it is desirable that the gymnasium should be opened for the benefit of those officers at this military station who may desire to avail themselves of its use.

The War Department authorities permitted the expenditure of post and company funds for fixtures and appliances for athletic sports, and in 1887, when by order of Secretary Endicott the establishment of canteens was authorized, official announcement was made that one of their objects was to afford to the troops "the requisite facilities for gymnastic exercise, * * * and other proper games."

It was not, however, until the administration of the present Secretary of War, Hon. Redfield Proctor, that the War Department took official action in the establishment of gymnasia and gymnastic instruction at the several recruiting depots in the country, the details having been drawn by Major Schwan, of the Adjutant General's Department. The favor with which the introduction of the present system has been received by officers and men is sufficient evidence as to the wisdom of the Secretary's action.

In January, 1890, the superintendent of the recruiting service was informed that an appropriation for the construction of a building for each depot, to be used as a gymnasium and drill-hall, having been asked for, "it is desired that, until a regular gymnasium has been established, one or more non-commissioned officers be designated in each company to instruct recruits for not less than one-half hour each week day, except Saturday, during their first month's stay at depot, in such athletic exercises as leaping, vaulting, running, etc." In the succeeding June, Congress made the desired appropriation, and authorized the construction of similar buildings at such other military posts as the Secretary of War might designate. In November the work was inspected by the superintendent, Colonel E. S. Otis, 20th Infantry, who reported as follows:

> The exercises which I witnessed at the gymnasium (at Davids Island, N. Y. Harbor) now located in an old frame building, and equipped from canteen profits, were severe and difficult of execution, but the men entered into them with spirit and apparent enjoyment. In regard to them the commanding officer remarked "that the system was complete, and that the recruit was exercised therein during his whole stay at depot, instead of the first month as heretofore. These gymnastic exercises are of greater value, and, for a recruit, of far greater importance than all the rest of the duties put together."

Of the gymnasium at Columbus Barracks, Ohio, he says—

> The gymnasium is popular and beneficial. Work there, which I consider the most laborious the recruit performs at depot, has great attraction for him. He never tires of it, and it breaks in upon the monotony of his tactical drills. The gymnastic exercises taught to the assembled squads are severe and rapidly progressive, and give noticeable physical development and elasticity of person, so that the participant is much more quickly "set up" and sooner acquires good military carriage and movement. It also inculcates or strengthens a desire for athletic sports, which follows him to his regiment, and usually makes him a better and more contented soldier during his entire enlistment.

In January, 1891, the Adjutant General acknowledged the receipt of these reports in a letter, from which I am permitted to make the following extract:

> The Adjutant General is gratified to learn from your reports that the instruction in gymnastics given the recruits at the two general service depots, though carried on in a somewhat desultory manner, has borne such excellent fruit, and concurs in the opinion you express that a systematic and progressive course in

gymnastic exercises should be pursued at all the depots. It is understood that at present the instructors, not always trained gymnasts themselves, are changing from day to day, or frequently; that squads are made up of partially instructed and wholly uninstructed men; and that the buildings used as gymnasia are occupied by different companies with no responsibility attaching to any particular one for the care of the apparatus pertaining to them. With a view of overcoming these difficulties and attaining better and more uniform results, the Adjutant General desires me to submit for your consideration the following outline of a general plan:

The setting apart at each depot of a suitable building or set of rooms for the purposes of a gymnasium, and, after properly equipping it so far as this can be done from canteen funds, of placing it under the charge of a competent officer; this officer to supervise, under the direction of the depot commander, the instruction and exercises in gymnastics of all recruits. It would probably be necessary to detail, besides one or more suitable non-commissioned officers as permanent assistants to the officer in charge of the department of gymnastics, one non-commissioned officer from each instruction company, who, having himself first been thoroughly trained, would act as squad instructor. It is thought that the officer in charge at each depot might prepare a simple and progressive course extending over a period of one month and embracing the most approved movements and exercises. Eventually the essential or meritorious features of the course thus decided upon at the three depots might serve as a basis for a hand book for the guidance of all depots.

The following extracts from letters of Colonel Parker, 13th Infantry, and Colonel Jordan, 19th Infantry, commanding respectively at Davids Island and Columbus Barracks, Ohio, are interesting accounts of the management of the gymnasium at these recruiting depots:

Colonel Parker writes—

A gymnasium was established at this depot (Davids Island) February 17, 1890, in one of the old wooden barrack buildings, there being no building specially constructed for or adapted to this purpose. A few of the ordinary fixtures for use in gymnasia (parallel and horizontal bars, wooden horses, swinging rings, etc.,) were put in the building, and Indian clubs, dumb-bells, wands, boxing-gloves, etc., are in daily use. There is also a room in one of the other barrack buildings used as a special gymnasium.

The drills are by companies, with non-commissioned officers as instructors, and are superintended by a commissioned officer. The system used is that of Archibald Maclaren, of the gymnasium, Oxford, England, and the body method of William G. Anderson, M. D., F. S. S., president of the Brooklyn Normal School of Physical Culture.

The regulation as regards hours is as follows: Daily (except Saturday and Sunday) one hour for each company, and the term was at first for recruits during their first month's stay at depot, but upon my recommendation it is made continuous during the whole period of the recruit's retention under instruction. The course is compulsory for enlisted men only.

So far as I am informed, the gymnasium here is the first one established in the Army, with the exception of that at West Point, in which a systematic course of instruction is pursued.

A few of our instructors have been regularly trained and all have studied with dilligence the methods mentioned above, but it is worthy of note that the selection of such men is a matter of difficulty; but with a curriculum formally recognized by the War Department, a regular system of examination and appointment of instructors themselves would secure men specially adapted as such, and relieve us of one cause of concern, *i. e.*, the apprehension lest such men may, unless they have been trained in established gymnasia, lack the necessary knowledge of general laws governing the application of things sanitary to those of mere instruction. In other words, may not instructors, through a too great zeal and lack of knowledge of general laws of health, do more harm than good at times by taxing the recruit beyond his strength, etc.?

It is a matter of general remark and comment here, however, that the establishment and working of the gymnasium has done more for the practical training of the recruit than any other exercise or drill whatever, and altogether has proved a most valuable measure in every respect, improving the health of the men, giving them a congenial employment, and "setting them up" as nothing else could or can do. I regard it as of great practical utility, and one that when fo mally recognized by the Government and given a permanent and homogeneous organization will prove of incalculable benefit.

Colonel Jordan, of Columbus Barracks, Ohio, writes—

About one year ago instructions were received to have a gymnasium established at this depot. No appropriation being available through the Quartermaster's Department, authority was obtained to expend not to exceed $450 from the canteen fund for the necessary apparatus.

A suitable room was set apart for the placing of the apparatus, which consists of light dumb-bells (wooden), Indian clubs, rowing-machines, horizontal bars, vaulting horse, flying rings, inclined ladder, climbing rope, striking bag, etc. A regular and systematic course of instruction was adopted July 23, 1890, recruits in their first month at depot being exercised in the gymnasium one hour each day, Saturdays and Sundays excepted, in such movements and position as were embraced in "Maclaren's Physical Education" (pp. 138 to 143). Company commanders were required to see that the recruits were advanced in a gradually progressive manner and that their strength was not overtaxed.

Previous to the regular establishment of the gymnasium the recruits in their first month had been required to be exercised in leaping, jumping, running, putting the shot, etc., during one-half hour of the morning drill, but this was greatly dependent upon the state of the weather, as it had to be conducted in the open air, but nevertheless, was very beneficial and much enjoyed by the men, as it relieved the dull monotony of their drill, especially where the scope is necessarily limited during the early stages of their military career.

The gymnasium is under the immediate control of 1st Lieutenant C. A. Williams, 21st Infantry, recruiting, mess, and canteen officer; but the instruction of each company is under the company commander and a non-commissioned officer specially designated, the latter being selected for his peculiar fitness for this class of exercise.

The course is not compulsory for officers, but is for enlisted men, especially during the entire time of their stay at depot. After the first month, which is confined to first practice "movements and positions" (pp. 138 to 143), "Physical Education," they are advanced in a progressive manner so as to embrace all the available apparatus in the gymnasium.

The system used is that of "Physical Education, by Archibald Maclaren, late of the Gymnasium of Oxford," a few copies of which were furnished for use at this depot. It is a gradual, uniform, and progressive system, but needs properly qualified instructors, practically acquainted with the system, to carry it out, and I might say is a little too elaborate for a practical manual of exercise.

The gymnasium is open daily, Saturdays and Sundays excepted, for voluntary practice with the apparatus, when not in use for regular drill.

The results have been beneficial, but this only being a depot where their stay is temporary, should be followed up by a similar course when they reach their regiments. The gymnasium relieves the monotony of the post, besides furnishing a pleasant and healthful occupation and amusement for men, and should be established at every permanent post. Its advantages are obvious in bringing about a spirit of contentment and affording an opportunity to work off their surplus energy. At permanent posts the gymnasium should be in a large hall, which could be utilized for many other purposes, such as drills in inclement weather and amusements during the winter season.

In order that I might lay before you the conditions at military posts in distant parts of the country, and at the same time show, by their own writings, how deeply all portions of the Army are interested in the work, I add extracts from letters that have been written by officers of the Army in reply to my inquiries for information.

Colonel T. M. Anderson, 14th Infantry, writes from Vancouver Barracks, Washington—

I beg leave to transmit the post order issued this year in relation to calisthenic drill and gymnastic exercises. A similar order has been issued every year since my incumbency as commandant. We had for a time a very good gymnasium, but it has unfortunately been destroyed by fire, and has not been reconstructed. While it was available I pursued the plan of having all the companies report once a week to a graduate of the Military Academy, to be instructed in the latest method of physical development employed at that institution. Since the destruction of the gymnasium, two years ago, I have been compelled to trust the physical training of each company to the respective company commanders. These officers have to devise ways and means to accomplish their purposes. If a man is stiff he must be given a variety of exercises to give him suppleness; if round shouldered or flat-chested, dumb-bells and clubs; if lop-sided and awkward, the balance step, etc. The course is compulsory for the men, but not for the officers.

The enlisted men have voluntarily organized a number of foot-ball and baseball clubs among themselves. In these sports many of them are nearly as proficient as professional players. This system of training began here four years ago. The object of our training is to make our men good marksmen and good marchers. Four years ago this regiment stood No. 22 out of 40 regiments in marksmanship; year before last it stood No. 1; last year No. 2. Four years ago we had many broken down, sickly men. For the last two years in our practice marches it was a very rare occurrence for a man to fall out of ranks.

Captain J. B. Burbank, 3rd Artillery, at Fort Sam Houston, Texas, writes—

The only organization known at this post for purely athletic purposes is in Light Battery F, 3rd Artillery. Its aim is the general development of physical proficiency through practice upon some twenty different machines and implements, as well as sparring, wrestling, and the general line of field sports. The instructor is a man of the battery, under my approval and supervision; the course is voluntary—no particular system is followed. The organization is only four months old, as all the apparatus is in open air, there being no available building or room for it at the post, a regular routine would be impossible; there is but a meager outfit. The equipment of the battery gymnasium was procured slowly, only as fast as we could beg the material from different sources, there being no funds from which to purchase it. Clubs, dumb-balls, gloves, etc., were purchased by funds subscribed by members.

Major D. D. Vanvalzah, 20th Infantry, writes from Fort Assinniboine, Montana—

There are at this post both a gymnasium and a bowling alley. The former is equipped with the usual apparatus, which includes horizontal and parallel bars, swinging rings, ladder, rowing machine, punching bags, football, dumb-bells, and Indian clubs. An average of 50 men use this gymnasium daily. There is no prescribed course of training, nor are the men required to take this exercise unless they so wish. The officers do not use the gymnasium, but many of them are fond of hunting and outdoor sports, and when opportunities offer, get their exercise in that way. It is of course understood that both officers and men have more or less exercise while performing their various military duties.

Colonel R. T. Frank, 2d Artillery, writes from Fort Monroe, Va.—

In addition to a baseball club, which has been in existence many years, there is at this post a small gymnasium in the rooms of the Young Men's Christian Association, established October 15, 1890, which is free to the officers of the post and to such enlisted men as have the privileges of these rooms—about one-half of the command. Formerly one of the rooms of the Fort Monroe (officers') Club was provided with a limited amount of apparatus for athletic exercises, but when the gymnasium was opened in connection with the Young Men's Christian Association, this, such as it was, was sent there.

Physical training, except as laid down in the drill-books, is voluntary ; no particular system is followed.

While there has been no regular system of physical training at this post, athletic games and sports of all kinds have been encouraged, and through the interest of some of the officers such sports have been arranged for the enlisted men on occasions like Thanksgiving and Fourth of July, *i. e.*, in which prizes have been competed for, which have proved of the greatest interest to observers as well as to all participants, thus enabling the men to pass the day at the post in the most agreeable way.

The efforts, of which I have given but an outline sketch, that have thus been made to improve the physical condition of the Army would have been barren of results but for the readiness which officers and men displayed in availing themselves of the opportunities presented ; they were not only willing but anxious to be improved because they appreciated the great necessity for it, and their hearty coöperation has rendered effective the means so far employed to make a success of what appeared to many but a doubtful experiment. Great as this success has been, much remains to be done in bringing the widely-scattered organizations, now acting on diverse lines, into proper order; in formulating a definite course of instruction based on hygienic and physiological principles; in collecting anthropometric data, and in so systematizing the work as to make it capable of yielding results that will benefit not alone the Army but the scientific world. But few Army officers have made a study of the principles upon which physical culture is based. Some are sufficiently well versed in its technology to act as intelligent instructors; many are willing to and do learn enough from text-books to carry on the work, and thus keep alive the interest of the men; but the large majority regard gymnastics simply as a means for developing skill in "manly exercise," and being ignorant of anatomy, physiology, and hygiene, cannot understand the application of their governing laws to the proper growth of the normal man. Hence we find nearly as many methods of instruction as there are instructors; the course laid down by Maclaren is followed at one post, that of Sargent at another, and that of Hitchcock at another; in the ever present changes in the *personnel* of a post, the methods of one instructor give way to those preferred by his successor. This is clearly set forth in the following extracts from a letter of a former commandant of cadets to the then superintendent of the Military Academy at West Point:

> The exercises in the gymnasium are now under charge of one of the officers of the tactical department. With the changes that take place every four years or oftener, valuable experience in physical development and athletic exercises is lost, and it is impossible to maintain any regular system of instruction. It is in consequence of these changes that the results of physical training in the past have not been uniformly good or always satisfactory.
>
> The necessity for the careful physical training of the soldier is now recognized, and undoubtedly will soon command the attention it demands in our Army. Aside from the benefit to the cadets, it is important that this training should be uniformly and systematically imparted, in order that the graduates may be well prepared as instructors for our soldiers.

This was approved by the superintendent, who says—

> A great improvement can be made in the instruction in the gymnasium, and I am sure it will be of great benefit to the cadets, who have too little exercise of any kind during the academic year.

Necessarily in the absence of intelligent direction, the important subject of anthropometry is neglected, and bodily measurements, save of height, weight, and chest girth, are made at a few posts only. In these few instances there is as much diversity of procedure as in the technique; at one or two places an elaborate system of measurements is used; at others only the extremities are measured; and I very much doubt if at any place the real value of the measures is fully understood and their application properly made.

You now see that the Government has a somewhat extensive gymnastic "plant," if I may use a business term, and scores of willing hands to carry it on. The question is, How shall it be managed to produce the best results? The answer is simple—by giving it a competent head, and by giving the competent head such authority as is necessary for permanent organization. That the answer is known to the authorities at Washington is quite probable, and that they would be willing to act upon it is equally possible. There is, however, no legal authority for making a permanent organization. Whatever regulations or appointments may be made by one administration might be changed by the next. It is therefore necessary that there should be the authority of law to accomplish the object, and this can be obtained only by the action of Congress. Assuming the action to be favorable, we naturally turn to the Military Academy at West Point as the location for this administrative instructor, presuming that the law has made provision for his chair in the academic faculty. We expect to find in him a master in physiology, in hygiene, and in anatomy, and a thoroughly well-equipped instructor in the principles and art of physical culture.

To you who are teachers it is unnecessary for me to dwell upon the obvious necessity for such a teacher or upon the important influence he would exert in securing and maintainng the health of the cadets, and by his teachings through the graduated officers in improving the bodily condition of the enlisted soldier; but I am of the opinion that the importance of such a teacher is not fully understood or appreciated in the military service, where the subject is comparatively new. Although sufficiently alive to the necessity of gymnastic training for officers and men, the connection of personal hygiene and intelligent medical supervision with such training is not, apparently, yet realized. The present object is rather to excel in feats of agility, or in athletic sports, than to regularly develop the muscular system; and to sink in the pleasure of the field the steady but less interesting training in the gymnasium.

Our naval brethren are somewhat in advance of us in this important matter, as they are represented in the Naval Academy by a department of physiology and hygiene, at the head of which is a surgeon in the Navy, who is *ex-officio* a member of the Academic Board. He has three assistants, one of whom had medical supervision of the gymnastic *exercises*. In reply to my letter of inquiry, Surgeon Harmon, U. S. Navy, stationed at that academy, writes as follows:

> There is a fairly well equipped gymnasium, with competent instructors, where boxing, fencing, small sword and broadsword exercises are taught as a part of the prescribed course for all cadets. In addition to this, the fourth class have obligatory gymnasium instruction from October to March one hour four days in the week. To the other classes the gymnasium is open daily during recreation hours for their voluntary use. The gymnasium is to be rebuilt, enlarged, and more thoroughly equipped during the coming summer, with a view of carrying out a more perfect and systematic course of physical training upon the lines laid down by Sargeant at Harvard University and by Hitchcock and Seeley at Amherst. A beginning has already been made in this direction. Upwards of a year ago a medical officer then attached to the academy, Passed Assistant Surgeon J. D. Gatewood, after a visit to Harvard, Yale, Amherst, and the German gymnasium in New York, drew up a report to the superintendent of the Naval Academy embodying a plan of accurate measurements, graphic charts, and a special gymnastic training, to make good the indicated deficiences in each individual. Passed Assistant Surgeon Philip Leach has succeeded Dr. Gatewood, and, beginning in October last with the new fourth class, he has already measured and charted them. Accompanying this you will find blank forms prepared for use in this connection, which have been, in their general method, taken from the report of the Anthropometric Committee of the American Association for the Advancement of Physical Culture, Brooklyn, New York, November, 1886.

The collection of anthropometric data from the Army, a body of men who are under constant military supervision, would be of great value to scientific men, as from no other source could they hope to obtain the record of a completed adult life in this particular. Beginning with the cadet upon his entrance to the Military

Academy between the ages of 17 and 21, or with the enlisted man from 21 to 28 years of age, and ending with the retirement of the officer at 64 years of age, or with that of the enlisted man after 30 years of service, an authentic physical history of 30,000 men and over 2,000 officers would furnish materials for study, the value of which cannot be overestimated, particularly when used in connection with, and possibly in completion of, similar work now going on in the public schools among children and growing lads.

The necessity for system in this particular is strikingly evident when one consults the older records of bodily measurements in the War Department, notably those prior to 1887, and finds them almost valueless from inaccurate and incomplete entries. An attempt was made to introduce Dr. Sargent's system of measurements, upon one occasion, but I have reason to believe that it has failed, simply because its object was not understood. Indeed I was almost ready to believe in the impossibility of securing accuracy in this kind of military record until I received the data previously referred to from Davids Island, which I shall be very glad to have members of the association examine. Its accuracy is evident, and I am inclined to think the reason is due to the interest taken in watching the gradual physical development of the men under the new system.

Prior to the introduction of the gymnasium, the bodily measurements that were made of recruits were confined to the height and chest girth, to which was added for cadets a few measures of the cranium and extremities. There was but little method in them, and the great mass of recorders, having no particular interest in the work, did not give it that close attention as to accuracy which is necessary for a complete record ; but since the object to be attained has become one of interest to the workers, and the channels leading to it have been planned by specially instructed men, this inattention has given way to accurate and faithful work, and some excellent results have been obtained in what has thus far been done.

I am satisfied that the circumstances are favorable and that the time is at hand for the institution of a comprehensive scheme for physical training in our Army, under the direction of some one who has the knowledge to plan, the ability to teach, and the legal authority to carry it out. I feel sure that we can rely upon the members of the association which I have the honor to address not alone for encouraging wishes and words but for active aid and assistance in the accomplishment of this work.

DISCUSSION.

Dr. Sargent.—It is suggestive that we should have a paper from a surgeon of the United States Army making an appeal for better physical training of the recruit, read before teachers who are familiar with and who have favored military drill as the only form of physical exercise for their schools. It seems to me this is a topic that may well give food for discussion. Why doesn't the recruit depend for his physical education on military drill? Why should he want any other?

Dr. Hartwell.—I think we are to be congratulated on having a paper of such a character presented to us by so distinguished an officer as Dr. Greenleaf, who is Assistant to the Surgeon General of the United States Army. It is a compliment that this Association may well appreciate that he has been detailed, under orders from the Secretary of War, to attend this meeting and present this paper. I am confident that I express the feelings of the Association when I express my gratification and thanks to Dr. Greenleaf for this paper. I presume it is news to most of us—it certainly was to me—that there is so extensive a movement in the army towards the improvement of physical training and its extension in the line of athletics and gymnastics, beyond the merely technical military drill. But we are passing through the same experience that other more warlike and enterprising nations have passed. There comes a time when military drill and the manual of arms are found to be entirely inadequate for the physical training of the soldier;—for making him a good marcher and marksman. He must learn to act without being in elbow touch. It is very interesting to see that officers and soldiers have begun to organize in some systematic fashion to learn athletics and gymnastics and it is clear that the movement is extending. I beg to propose the following resolution:

Resolved, That a committee of five be chosen by this Association to confer with the proper authorities and urge upon them the desirability and necessity for Congressional action in authorizing a Professorship of Physiology, Hygiene, and Physical Training at the United States Military Academy at West Point; and to take such other action as the committee may deem proper.

I think there should be a professor having this matter in charge on the academic board at West Point. If the physical training of the army is to proceed in a well ordered way, taking account of the experience of other nations in this respect, an army gymnastic department will, it seems to me, be found necessary. The experience of England, France, Germany and other nations points to this. As early as 1822, Captain Clias, a Swiss, introduced gymnastic exercises into England for the army and navy recruits. He held positions at Woolwich, Sandhurst and Greenwich for some years, but the interest did not last long. It was not until after the Crimean war that the necessity for such training was clearly recognized in England. It was then proved that the inherited brawn and pluck of the Briton were not enough. An army commission was sent abroad to consider what was to be done. In 1859 this commission was formed. In 1861 the Central Military Gymnasium at Aldershot was established and MacLaren's book, on the basis of the French exercises, was adopted as the gymnastic code of the British army. It is still in use, though it has been superseded in some respects, and the present superintendent of the Gymnasium at Aldershot, Col. Fox, has introduced several new forms of gymnastics. Besides weapon and bayonet drill there is instruction in light gymnastics. At Aldershot a certain number of non-commissoned officers are trained to give instruction at the military depots. There are some seventy military gymnasia in various garrison towns in Great Britain. The instruction is chiefly in the hands of the drill sergeants. But the instruction of the recruit must begin with gymnastic exercises. This is continued for two or three months, and at intervals afterwards. It is not so thorough going, nor so well ordered or successful as the military gymnastic instruction of Germany. That is what we might expect. At the same time it accomplishes a great deal of good and has had a very marked effect upon the development of gymnastics in England. Retired officers who have served for five years in the department of Military Gymnastics have in several cases assumed charge of gymnâsia belonging to Public Schools. Most gymnastic teachers are retired sergeants who have been trained at Aldershot. The effect of giving instruction in gymnastics to this class of men, under-officers, sergeants and corporals, has been to present the fullest development of gymnastics in England. Gymnastics in England, curiously enough, have come to be considered a substitute for athletics. The promoters of benevolent schemes in the East End of London, and elsewhere, do their best to give opportunities for athletic sports to the poor, but they frequently have to be satisfied with fitting up a room with some gymnastic apparatus and setting a drill sergeant to giving exercises. So gymnastics are often looked upon as an institution for the working classes. But they are beginning to see, in the board schools and elsewhere, where gymnastics have been put under law, that drill sergeants do not fill the bill. German and Swedish gymnastics, under teachers of better antecedents than the drill sergeants, are making some headway and the fight is still between them and the Aldershot system.

Gymnastics were introduced into the Prussian army in 1851. At the head was Rothstein. The Royal Central Gymnastic institute at Berlin was founded for training military officers and teachers for the schools. The military and civil divisions have been separate and distinct since 1877. In Germany, whatever is considered worth doing at all is considered to be worth doing well. There is therefore no question whether officers like gymnastics, the officer must learn gymnastics. So the teaching in the central institute at Berlin is directed toward the training of officers and teachers. The same is true in the institute at Stockholm. There are two courses a year at Berlin. One hundred men take a five months' course and then return to their regiments. Under their control and their supervision and example, the squads are drilled by under-officers. All officers of the German army are required to be familiar with the principles of gymnastic teaching, and the younger officers may be called in to teach and practice gymnatics. The German soldier under the colors serves for three years. His first training is in gymnastics, then in weapon gymnastics, then in heavy gymnastics and finally he is taught to scale ramparts, climb walls, leap ditches, etc. Military drill, by itself, is not considered sufficient in any European army that I know about.

The British army has an elaborate and highly organized system for promoting athletic competition and exhibitions among both men and officers. I attended the eleventh meeting of the Royal Military Tournament last June. The different military districts were all represented by picked teams, the men which had been winners in the local competitions. The military gymnastics, artillery drill, and cavalry exercises interested me especially. A full account of the military gymnastics and athletic sports in vogue in the British soldier may be found in the last number of *Outing*.

I move the passage of this resolution.

The President.—The resolution will be presented at the business meeting.

SOME OF FRANCIS GALTON'S TESTS CONCERNING THE ORIGIN OF HUMAN FACULTY.

BY KATE CAMPBELL HURD, M.D.

At the door of the South Kensington Scientific Collection in London there is a sign bearing the words :—"*To the Anthropometric Laboratory.*"

As to the meaning of the long Greek word, many of the "globe trotters" who flit in and out of European museums have not the remotest idea, but they have a surplus of natural curiosity which leads them to look for the room. There they find men and women, mothers and children, who are being measured for the third or fourth time to guard against the insidious onset of any dread disease. Their eagerness in comparing the new measures with the last, in watching for improvement, in sadly marking diminished strength, is very contagious as well as is the feeling of yet a third class who have journeyed from afar to see this famous laboratory where, without money and without price, rich and poor may be measured and taught the value of the marks.

The room is about 30 x 20 feet, along its walls are huge composite photographs, magnified thumb prints, eye charts, and queer unknown instruments. Long tables are filled with curious machines, there are scales, measuring rods and dynamometers, whistles, colored worsteds, and tables of comparison. The visitors ply the measurer with questions, and never can restrain their desire to be themselves measured, which involves arguments and quandaries as to who weighs the most and who have grown. Two people of nearly the same height always argue their individual conviction and neither is convinced until the actual cold steel proves the exact height, weight and cranial capacity. It is amazing to see the interest they take in studying charts and diagrams, and to note their solicitude lest their own figures fall below the average. The measuring takes ten minutes, they ask questions for about ten more, at the end of which time no man can flatter himself that his natural capacity is greater than the instruments have marked, or that he has the slightest excuse for laziness or lack of ambition to do whatever his physical power has shown him capable.

This is Francis Galton's laboratory, where are collected the statistics and data whereby he can give to the world his remarkable works on "Natural Inheritance," "Inquiries into Human Faculty and its Development," and almost countless notes and memoirs for the London Anthropological Society published in their journal.

In justification for the trouble and expense of the laboratory, Mr. Galton hopes to be able to discover how far the strength and keen sensibilities of children may be accepted as true indications of the future efficiency of the man. How candidates may be safely chosen to fill important posts; also the influence of special education on natural capacity: more than this, he deals with precise measurements in order to teach the great mass of educated men to whom the laws of higher statistics are unknown, the closeness of correlation of the various parts of the body, the degrees of values of kinship, and, by the combination of mental tests with physical, to measure a man to-day, and each six months following, as a preventive to nervous prostration, consumption and other insidious diseases.

Twelve hundred people were measured in 1889, in Mr. Galton's laboratory, but before that at "Health" congresses statistics had been gathered which startled even mathematicians, by applications of measurements of variety and tables of distribution to the laws of "Frequency of Error," and of the "Probability Integral."

In a monograph of Prof. Cattell on "Mental Tests and Measurements," Mr. Galton makes the following observations. "One of the most important objects of measurement is to obtain *general knowledge* of the capacities of a man by sinking shafts, as it were, at a *few critical* points. In order to ascertain the best points for this purpose the sets of measures should be compared with an independent estimate of the man's powers."

The measurements taken at the Galton laboratory are written on a printed paper which the individual keeps, and a copy of this is kept on the record books. The index is made with reference to date of birth and not to name. There is a note made of eye color, sex, condition, nationality, and the person is weighed in indoor clothing; height standing is taken with shoes on, from which the height of heels is deducted; he takes height sitting, span of arms, knee height (to top of knee and deducts heel height as before), head length and head breadth, both taken with calipers, length of elbow to finger tip, and of middle finger, tests strength of grasp of each hand, and breathing capacity. Then come the special sense tests, some of the apparatus for which I have with me.

Keenness of eye sight, each eye taken separately, is measured by the distance at which diamond numerals may be read. These figures are arranged on little blocks placed on an inclined plane, two inches apart, and are looked at through an eye hole. Mr. Galton has found that out of 398 men between the ages of 23 and 26, fifty per cent. could read the letters at 25 inches from the eye, whereas of 433 women fifty per cent. could read only 24 inches. Man's sight, as a whole, was more acute than woman's. When arranged in the binomial curve into which the measures will always group themselves, the lowest degree, 5°, indicated a near vision of 13 for men and of 10 inches for woman. While the highest read was 34 inches (men's) and 32 (woman's).

I have taken these tests at the Bryn Mawr School with one hundred and twenty-five pupils of 10–19 years. The *average* and the *mean* vary, somewhat. For some unaccountable reason our girls of 15 had a vision of only 17 inches length, whereas those older and younger could see 20 inches. The length of vision in a still older gymnastic class, 20–30 years, averaged 17 r. 16 l. eye. These are from too narrow data to be of much value, especially as the number was too small even with the numbers from Bryn Mawr College to form a true binominal curve. Our greatest and lowest limits were 5 and 31 inches. At Bryn Mawr College, the freshmen and seniors seemed to have a shorter vision than the middle years, the greatest vision at the College was 33 inches, the shortest 5.

Velocity of blow is one of the psychological tests taken at the laboratory. The Galton apparatus is much simpler and less easily bungled or broken than than the Hipp Chromograph, and much less expensive than that one manufactured by Clay & Torhenson in Philadelphia, though I have no means of comparing the results of the two instruments. The experimenter's swiftness of motion is measured by the rate at which he retards a string which he has pulled out at arm's length. This string travels over a scale marked in relative feet to the second, and as it is sent swiftly or slowly a little button indicator marks the rate on this scale. The apparatus is about 150 c. m. long, and I could not easily bring it with me.

Mr. Galton has taken the test with 516 men, fifty per cent. of whom could make a motion through 18.1 ft. per second, and out of 271 women fifty per cent. could move with a velocity of only 13·4 per second. At the extremes of the curve were 13.2 ft. and 23.6 ft. in the case of men, while with women the limits were 10 ft. and 16.9 ft.

AVERAGES—GALTON TESTS.

Bryn Mawr School.

Age.	Reac. to Hearing.	To Sight.	Veloc. of Blow.	Diamond Type.	Hearing, R. L.
9–10	15	22.	9·5		3·25–3·50
11–13	11	18.	10.	20	3–3·
14–15	10	17.	11.	17	3–3·
16–18	11	18.	10.	20	3–3·
18–30	11	18.5	9.	17–16	3–2.9

Bryn Mawr College.

Fresh.	9	15	9.	18–20	4–4·
Soph.	8	16	9.6	21–20	5–5·
Junior.	9	15	9.	21–21	4–3·
Senior.	10	15	9.8	19–19	7–7·9

Means of the Entire Set.

No. of Observations 181–226.

	14	16	10	19–19	3–3

Averages of the Entire Set.

	10.4	18	10	19–20	4–4

Friends' School, Wilmington.

Observations.	Reac. to Hearing.	To Sight.	Hearing, R. L.
45	13	20	4–5

In our school as well as at Bryn Mawr College the mean was much smaller than this; in place of 13.4, 50 per cent. of our pupils could move with a velocity of only 10 feet per second, while at the extremes were 6 and 17.6, both for our school and for the college.

Possibly this is owing to some fault in the apparatus, for the wire occasionally becomes bent and the button is not self-registering—two opportunities for some one of ingenious mind to improve on the Galton apparatus.

The apparatus for recording the reaction time of touch to sight and sound, I am glad to have with me. The pendulum swings in the arc of half a second; the touch action is made on a little lever which stops the pendulum instantaneously. At the same time that the pendulum is set in motion the sharp click is made which must be answered by the reflex action. Instead of with the click the pendulum may be freed by another lever which changes a blue card to white, and this change must be indicated by touching the lever to stop the pendulum. The arc over which the pendulum passes is marked in hundredths of a second.

In measuring this reaction we note the time required for the impression of light to pass to the optic thalami, then through the cortex cerebri to excite consciousness and volition, in order to act upon the motor centre of hand or voice.

Mr. Cattell assumes that changes do not penetrate the cortex when a simple reaction is made unless there are two colors to distinguish between, inferring the reasoning power. Supposing now, that the centripetal and centrifugal journeys through the brain require the same time, and perception of light and volition the same, we may divide our result in half to obtain the true time required for the simple reflex act. The motor reaction is always slower when made with voice than with hand. This I have often noted when the students wished to indicate to me the duration of 10 seconds of time. Time varies with the colors chosen, with shades, with different letters or figures. The average time of a sight reaction is .158, including the two latent periods and nerve transmission. According to Physiologists, the rate of motor nerve transmission varies between 33 and 62 m. per second, and in a sensory nerve this velocity is not so great, hence we are led to infer that .05 sec. are required to send an impulse from the retina to the brain and thence to reflect it to the hand.

It takes .25 sec. for the chemical process in the retina, *i. e.*, for the determination of light, color, figure, etc., and .25 sec. for its recovery. These are both called "Latent periods."

These reactions are much shortened by practice, so we may suppose that at first volition and co-ordination are required, this then of necessity involves the impulse from the optic thalami to corpora striata, but after the movement has become purely reflex the willing occurs before the stimulus, hence the measurement of time would concern more purely the reflex act, allowing no time for consciousness and volition.

In accordance with a suggestion from Mr. Galton I have been making some experiments in this line, taking the tests with a few pupils every day, noting the time for both sight and sound. Velocity observations are, however, too few and of too little consequence to report at this meeting.

In an article on the Relative Legibility of the letters of the Alphabet, Mr. Cattell laments that our sight is becoming ruined for reading on account of the difficulty of discerning the different letters, punctuations and characters in our written language. He has made some most instructive experiments at his laboratory as regards the time required to discern and name a letter and he finds the letter W most easy to differentiate, and E most difficult. S, C, O, G and Q very illegible at a distance, and punctuation marks, a very great trial. He says that in as much as inertia is a property of our sense organs, we ought not to allow our eyes to become ruined by the double strain required to overcome this inertia and adapt the accommodation to unnecessarily difficult symbols of language. He suggests casting out several letters, C, Q, and X which can be replaced by one or two others, substituting the Greek γ and λ for g and l, and using *spaces* of different lengths to indicate pauses, in place of the trying commas, semicolons, etc., now in vogue. You see from these experiments the great possibility and value in mental tests; this one alone ought to stand as a warning to us of this generation to preserve the perfection of the eyes of the next generation and of all future posterity by such slight modifications as a change in types and in a few symbols; lest by continuing with our present imperfection we transmit to them short sight and weak eyes.

Mr. Galton's test for hearing is a simple little whistle; the bore of the tube may be made so small that the vibrations may reach

18,000 or 20,000 a second, and gradually be enlarged by the movement of a little cog wheel which also moves an indicator over a scale marking the diameter of the bore. This whistle has then a sound which is sharper and shriller than the sounds in the street, it does not attune itself to any passing sound, and for this reason it is a more accurate test of hearing than the tick of a watch or the old tuning fork. Air is forced through the whistle by means of pressure with the thumb on a rubber diaphragm. The person to be tested stands at a distance of ten feet and responds by a knock on the wall to the faintest sound which stimulates his auditory nerves.

The whistle which Mr. Galton uses in his own laboratory is large and clumsy, requiring a huge bellows, a lever four feet long, and a large arc, but I presume the test is the more accurate. The experimentor sits in close proximity to the whistle, listening intently for the faintest sound.

Some of the minor tests which Mr. Galton employs are Color sense, Division of a line, test of squareness, and thumb print.

By his colored worsteds he has proved four per cent. of Englishmen to be blind to greens. I do not know what our American statistics tell, but certainly that is a very large ratio.

Division of a line is an amusing test; it often seems to me with our younger pupils that a good hit is made rather than a good proof of accurate measurement. The errors varied greatly; the coefficient of variability was ⅛ inch, *i. e.*, the measures were liable to fall within ⅛ inch distance from the mean, either to right or left. The mean was $\frac{1}{16}$ inch from the centre.

The test of squareness was much easier to take perfectly. To place a perpendicular rod at right angles to a horizontal line seemed comparatively simple, and the errors were few in our school—so few that I did not think it worth the while even to suggest that test at college. Had the rod been merely the thickness of a hair, the test would have been valuable as a test of ocular judgment.

One of Mr. Galton's most interesting experiments is that investigation which he is now carrying on at the South Kensington Laboratory, in the collection of thumb prints. The impression of the ridges, such as has been often made a means of the identification of criminals, is made in printer's ink, or on smoked paper.

I have recently received from Mr. Galton a leaflet entitled "The Patterns in Thumb and Finger Marks: on their arrangement into naturally distinct classes; the permanence of the Papillary Ridges that make them, and the Resemblance of their Classes to ordinary Genera." The point dwelt upon in this monograph concern the classification of the patterns in the ridges; they group themselves into about nine radically different forms; the primary one occurs in 3% of all cases not clearly marked but which develop into other forms. About forty varieties are found.

That these thumb patterns are permanent was proven by Sir Wm. Herschel, of the Indian Civil Service, who used the test to check impersonation. He found that the impressions of fingers of four adults made thirty years ago, corresponded exactly with their impression made to-day; and the print of a boy's thumb has not changed in nine years. Not one single ridge failed to give its exact counterpart even after the lapse of years.

Mr. Galton continues:

"Lastly, the various patterns were shown to be central typical forms from which individual varieties departed to various degrees with a diminishing frequency in each more distant degree, whose rate was in fair accordance with the theoretical law of frequency of error. Consequently, wide departures were extremely rare, and the several patterns corresponded to the centres of isolated groups, whose isolation was not absolutely complete, nor was it due to any rounding off by defined boundaries, but to the great rarity of transitional cases. This condition was brought about by internal causes only, without the least help from natural selection, whether sexual or other. The distribution of individual varieties of the same patterns about their respective typical centres were precisely analagous in form say, to that of the shrimps about theirs. It was argued from this that Natural Selection has no monopoly of influence either in creating genera or maintaining its purity."

In a letter which I received recently from Mr. Galton he speaks of the interest he takes in the question of the hereditary transmission of these thumb and finger ridges, but he has as yet insufficient data for use.

I have obtained family thumb prints from about thirty pupils in our Bryn Mawr School. Of these twenty-two sons inherited one or both thumb marks from the father and only two from the mother. Thirty-four girls had father's and twenty-two the mother's thumb print, one or both distinctly marked.

Mr. Galton also finds an interesting relation between the fineness of the ridges and the general sensitiveness of the individual. This I have not yet considered; but our girls have been very much interested in a little unscientific study of the patterns as regards natural inclinations. The coincidences of thumbs with a whorl in the centre and a mathematical bent of the mind, have been very numerous A long and narrow upward loop is associated with a scientific mind; a shorter loop with a language or literary ability. There are others which coincide with artistic faculties, and a great majority which as yet indicate no great talent in any special line. I judge that this is play, and interesting as a superficial study of palmistry.

One great beauty in the study of thumb prints is that the patterns being always the same, age is of no consideration, a factor which is of great annoyance in charting other measurements.

As I have mentioned above, Mr. Galton takes only a few important tests of each individual, sinking these shafts at special points; and by a system of correlation placing the entire man in his rank among his fellow men.

In charting measurements, Mr. Galton divides his tests into three classes: linear, cubical, and spherical sense tests named. In the first class he considers stature, span of arms, etc., to assure himself of the proportion or disproportion of the various parts of the body. In the cubical tests he places the weight, grasps, muscle tests, breathing capacity, etc.

In his marks assigned for strength tests, Mr. Galton throws out of the group those which fall beyond the lowest or the highest 5% on the scale. If the range of grasp of young men was between 56 and 96 pounds, then 5% of the whole number were below and 5% above these limits. Roundly then, no marks would be given for less than 55 pounds strength, and for each additional 5 pounds one check is added.

In the second group must be classified swiftness and breathing capacity in relation to strength and endurance. A racer is relatively stronger than a cart horse, because he is able to move himself more easily in proportion to his weight. Let this be expressed numerically with the unit of strength for numerator and the unit of weight for denominator. As before, the highest and lowest limits must be cut out from the marking system.

Multiply the swiftness by the strength and we have a new problem which gives us the momentum of a blow.

As to lung capacity, the numerator should be its own number of cu.c.m., and the denominator the pounds of body weight, or the inches of stature.

Mr. Galton tells us very little new in the comparison of the various lengths of the members of the body ; his conclusions are, however, forcible, viz.: that whenever a person is to be chosen to fill any sphere of importance, a full series of physical tests should be made and the opinion of the judge biased greatly upon these tests.

By these tests of bodily efficiency, however, Napoleon, Nelson, and other great generals or commanders, would have been peremptorily excluded from active service. Herein lies the beauty of the psychical tests such as Mr. Galton takes. You know what the doggerel says of Aristotle :

" Appear, thou little lisping seer !
Come forth and show thy little head
To one who holds thy memory dear—
Thy body, say—ah !—where is it ?—
Thy mind—we'll not ask where is he,
'Tis immaterial and 'twas lit
By God's own mind and thou wilt be
An ever burning, shining light
Among the intellects of the Great Infinite."

And listen to this anonymous doggerel—it's as trus as an epic :

" Thy Cuvier's mind was simply vast,
  Napoleon's mind was a great force ;
Their heads in different moulds were cast,
  And each mind had a separate course.

They were as apart as are the poles ;
  The brain of one was broad and deep,
A large recess of docket holes
  Where t'other might despatches keep—
    The small man's brain was greater far
    In creative force, diplomacy and war."

In a communication to the Royal Society in 1888 (Dec, 5), Mr. Galton writes in regard to Co-relation :—" It is easy to see that co-relation must be the consequence of the variations of the two organs, being partly due to a common cause. If wholly due to common causes the relation would be perfect, as in two arms, two feet, etc., To say that the average variation between stature and cubit is as 100 to 37, gives no idea of the *ratio* of their differences. The relation between cubit and stature is such that for every inch or centimeter that the cubit deviates from the mean length of cubits, the stature will, on the average, deviate from the mean lengths of statures to the amount of 2.5 units. Conversely for each unit of deviation of stature the cubit will deviate 0.26 inches.

Finding the value of the probable error of any one measurement of cubit to be 1.42 c.m., and that of stature 4.44, the deviation of stature as compared with that of cubit is as 1 to 0.8, the co-relation is then 0.8. Marshalling the measures of each limb in order of their magnitudes, and dividing them into quarters called Q_1. M. and Q_3 — M. is taken as the medium or middlemost value, whence deviations are to be measured and ½ $(Q_3 - Q_1) = 2$ or the probable error in any one case. In this way the M. and Q. of any orderly series of measures may be found.

Out of 350 measurements the following table was formulated :

	M.	Q.
Head length	19.35 c.m.	0.48 c.m.
Head breadth	15.24 c.m.	0.46 c.m.
Stature	170.69 c.m.	4.44 c.m.
L. Mid. Finger	11.53 c.m.	0.38 c.m.
L. Cubit	45.70 c.m.	1.42 c.m.
Height R. Knee	52.00 c.m.	2.03 c.m.

Thus, with this Q value you can compare memory with keenness of eye sight ; or breathing capacity with strength.

A deviation of $\frac{1}{10}$ inch in length of head has been found equal to a deviation of $\frac{1}{10}$ inch in stature, and conversely 1 inch deviation in stature = $\frac{8}{100}$ inch in that of head. Again, $\frac{1}{10}$ inch deviation in length of middle finger = $\frac{31}{100}$ deviation of left cubit, while, on the contrary, 1.3 variation in cubit = .07 variation in middle finger.

With such a table, given any one measurement you may construct the whole man in a more accurate and scientific manner than anthropologists generally plan their ancient bones into complete skeleton.

Comparing the mean deviation of one to the mean deviation of the other, the measure of co-relation is found. The accompanying table gives the results.

Stature cubit, 0.8; Stature Head length, 0.35; Stature mid. finger, 0.7; Mid. finger cubit, 0.85; Head length, head breadth, 0.45; Stature Height of knee, 0.9; Cubit Height of knee, 0.8.

There is always a regression toward the Q when subjects are compared with reference to these deviations. Mr. Galton says this very thing with reference to Kinship in his article on Hereditary Stature (Proc. Roy. Soc., vol. 40, 1886, p. 42). Here too comes the co-relation of the varieties, of father to son and son to father, uncle to nephew, etc., all adults.

The Q values of a family must be those of the entire population. The female statures must be transmitted into males by multiplying by 1.08 in order to bring the female type up to the male grade for facility of comparison.

The laws of Frequency of Error have been put to severe tests with statistics and anthropometric data so as to render them very simple and serviceable in co-relation, and prove their trustworthiness in so far as the present tests are concerned. Find the Q of each set as unit of variableness and for purposes of comparison.

The process is simplicity itself when once comprehended, and serves purposes innumerable. To quote again from Mr. Galton: "Transmit the measures so that the unit in each case is equal to the probable error of a single measurement in its own series; then let $y =$ the subject, let x_1 x_2 x_3 be deviations of the relative whose mean is x; then (1) $y = rx$. (2) R is the same whichever of the two variables are taken. (3) R is always less than one. (4) R measures closeness of the co-relation."

As to variation and its modes of expression, the methods of ascertaining it are very simple. The order is always true, and may be exactly expressed. Just as the mean may be definitely stated, so easily may the 20th or 60th grade be defined. Greater interest is attached to the individuals at the limits of a marshalled series than to the vast democratic majority at the centre. This weighty regulator does not help in evolution; the lower limit of its scale certainly retards progress, but the heroic qualities at the upper extreme may be increased through the study of its laws and close examination of its causes until the whole scale be raised one to ten degrees. For proof look at the ancient Athenians on their heights of learning and education, physical equal to mental, and think of the ages this glory was in reaching its height. Surely the movers of this century see that wherever we strive to increase in equal ratio all the protoplasm in an individual, just so much greater men and women will comprise the nation of the next generation.

Study Galton's table of normal distribution and learn the measures of variability in human faculties; tabulate and arrange them, not with reference to an average, which gives you only a muddle, but take the *mean*, the *middlemost* value, and the quarter divisions from which you may deduce the Frequency of Error and the deviation at any known grade. This once known, we may obtain the absolute value at every other grade. The measure of variation, or Q in stature, is found to be 1.7 inch; therefore, to find the deviation in stature at any known grade we multiply its value by 1.7.

Thus, if in an archery contest 30% failed to pull 68 pounds and 60% failed to pull 77 pounds, what are the Q and the M of the group?

Now, the tabular grade at 30° is $-$ 0.78, and at 60° is $+$ 0.38; their difference is then 1.16. The difference in pulls is 9 pounds; $\therefore$ Q $= 9 \div 1.16$, or 7.8 pounds.

To find M, multiply 0.38 (grade 60) by 7.8, and subtract this from 77, and the result gives M $=$ 74 pounds. Or multiply 0.78 by 7.8 and add to 68 and the result gives M $=$ 74 pounds as before.

Mr. Galton insists wherever the M is calculated, the numbers at certain grades should be determined and the Q always given, in order to apply the law of Frequency of Error to the entire series. Problems of co-relation and family likeness cannot be solved in any other manner.

We should apply this method in averaging a man according to his relative rank. We must be able to compare his breathing capacity with his stature or weight or strength, and to do this intelligently, diagrams must be made from large numbers of statistics in order to place the man at a glance in his proper grade.

Taking the statistics of female heights, and transmuting them into their equivalents in male type by multiplying each one by 1.08, it is found that the mean or middlemost grade, 50, corresponds to a female height of 63 inches. This is in the case of English women, and while I believe that it is generally conceded in America that the average woman's height is 64 inches, according to Galton man's height at grade 50 is 67.8 inches, and grade 40 indicates only .6 inch less; hence in order to chart measurements we must know the exact tabular values, for the progression is not regular between the grades.

A man 68 inches tall should weigh 144 lbs.; a woman 68 inches tall should weigh 155–160 lbs., and woman's breathing capacity is 20 cubic inches less than man's.

The question arises: Taking into consideration the influence of heredity on stature, can a man materially alter his predestined height?

Look at his formative protoplasm, think of its definition, of its functions, automatic, contractile, assimilative, reproductive, etc., and then think if it would be possible not to change form with exercise which developes hitherto unused cells, and prevents the atrophy of others. We cannot measure a man's opportunities; we are prejudiced at a glance by glamor and glitter, and seldom see on the surface his power and capacity for work, mental or physical, which lie deeper and on which as an inherent basis his reputation must stand or fall.

Mr. Galton has found a ratio of noted men to 4,000 ordinaries in England. Must we accept this ratio as inevitable? Civilization has imposed new relations upon us, and each day the battle for positions grows fiercer and weaklings are wiped out because of poor powers of physical endurance, owing to poor clothing, poor food, poor air, and a general carelessness of hygienic duties.

Great geniuses have endurance plus agility and intelligence with which they combat the fateful law of regression and mediocrity. More than half the names well known in fiction, in literature, in politics, had eminent fathers and strong, sensible mothers; think of Caesar's ancestors, Alexander the Great's, and of Pitt, with the great Duke of Wellington for his uncle.

In order to thoroughly test a man we must seek through psychometry to measure his energy, pluck, endurance, memory, intuition, power of balance, relations of balance to strength tests. We must advise him about sleeping, walking, and find his perseverance in order to foreshadow to the youth his own manhood and dotage.

Mr. Cattell, at the University of Pennsylvania, is already testing memory, retentiveness, attention, distinction of difference in very minute objects, and in this he may do wonderful things for anthropometry. We are a progressive race. Nature teems with potential energy, why not turn it into dynamic? Why not wrest our own protoplasm from the blind abyss of fate? Says Galton, "We are in crying need of a greater fund of ability in all the stations of life, for neither the classes of statesmen, philosophers, artisans or even laborers are up to the modern complexity of their profession." Moral culture is progressing faster than physical culture, and without the one to check and control the other we shall find ourselves submitting more and more to the fateful wheel of regression.

In "Hereditary Genius" Mr. Galton rather deprecates the facilities for general study in that they make people smatterers; he says that men who have high natural abilities but no social position are much more liable to reach the pinnacle of fame than those who have the social position and all the advantages of colleges for the taking; these may make men of culture, but not eminent men unless they are gifted with extraordinary natural will power.

In "Natural Inheritance" Mr. Galton deals extensively with the Law of Regression. He resolves order out of the wildest chaos, and marshals the apparently confused array of statistics into the perfect harmony of mathematical laws. Prof. Franklin, of Johns Hopkins University, in writing a review of the book, says that no mathematician can help admiring Mr. Galton's skill in tracking out the currents of heredity by these refined methods of the theory of Probability.

Take the subject of stature. A child deviates from the standard height ⅔ as much as his parent, *i. e.*, given the average height as 68¼ inches, a parent whose height was 71¼ would have a child only 70¼. This ⅔ or coeffient of regression means that ⅓ of the parent's excessive height is lost in the child. Without this wise regression, deviations from the natural type would become more and more exaggerated (p. 104). The child is a compound of the latent elements of its ancestors, hence its general tendency towards the common type.

There is a seeming paradox in the fact that an extraordinary child may not have had extraordinary parents; it is more common, indeed, to find an exceptional child of mediocre than of exceptional parents, for the mediocre parents far outnumber the exceptional ones, and have more children. Numerically then the regression from exceptional child to parent may be ⅓, so that if a child is 71¼ inches tall the parent will be 69¼ (p. 106). More remote relationships are more difficult to tabulate, but a brother will deviate ⅔ from the level of mediocrity, his son ⅓, a nephew $\frac{2}{9}$, a grandson $\frac{1}{9}$, and 0 in more remote relationships; therefore a man's brother is twice as nearly related to him as his father.

Mr. Galton arranges eye colors into groups, and finds by his calculations that out of 183 children of both light and dark eyed parents, 172 *ought* to have light eyes, and that 174 really have light eyes.

Prof. Brooks thinks that if Galton had ruled out *peculiarities* in stature caused by accident, *non-inherited*, he would not have found regression so marked; but I see no reason why it might not have been increased by ridding the lists of these abnormalities. It would have been interesting to study the effect of a tall and a short parent upon the offspring, *per se*, instead of transmuting the female and taking the mid-parent or average of the two.

Mr. Galton deals quite extensively with the subject of the inheritance of disease. His tables have afforded him opportunity to investigate this question more to than a limited extent. He finds it totally impossible to make his statistics from the well known curve of Frequency of Error in the case of consumption. Accidents too numerous for calculation make a double curve. There is no mid-value; a group is either immune from phthisis or it has the disease in severe forms. Consumption tends to be transmitted strongly or not at all, and this resembles the influences of cousin marriages. Mothers were more often affected than fathers; in fact the death ages of mothers in general was fifteen years younger than of fathers! This is a point worth considering. Can we let our girls grow up so wrongly dressed, with so little attention paid to their chest-developing and lung-strengthening exercises that they shall still further increase these figures?

"Natural Inheritance" concludes its summary in somewhat the following manner (p. 195): "Two causes affect family resemblance: the one is heredity the other is circumstance. That which is transmitted is only a sample taken partly through the operation of "accidents" out of a store of otherwise unused materials, and circumstance must always play a large part in the selection of the sample. . . . . . The circumstances of meeting are more varied in Co-Fraternities than in Fraternities, consequently Co-F's differ among themselves more widely than Fraternals.

A child receives one-fourth from each parent, one-sixteenth from each grandparent, but the factor of stability of type depends on the ratio of regression. Latent elements follow the same law as personal ones and a trait may be inherited from any one ancestor and not from another. The stock must be good, not easily blended and stable.

Whatever be the laws which govern our progress it is much more interesting to be moving than to have been made perfect and complete. An anonymous writer on "Psychosis" says:

> "God might have made an angel when
> He breathed in man the breath of life.
> Responsibility man then
> Would have escaped and care and strife—
> He might have basked beneath the sun,
> And lived a life of sensuous ease,
> And evolution might have run
> And left undone all God's decrees.
> But what a tame, insipid thing
> If man on earth had naught to do but flap a wing."

DISCUSSION.

Dr. Sargent.—I am surprised to learn that Mr. Galton has been taking height with shoes and deducting the height of the heel. It will be interesting to know if the statistics which he took at the Health Association Exhibition were taken that way. It seems to me that this way of measuring is a source of error. I am surprised that a man so uniformly accurate as Mr. Galton should adopt it.

Dr. Gulick.—Why is it a source of error?

Dr. Sargent.—Because it is impossible to calculate the difference in measure to tell just where the heel of the boot stops and the heel of the foot begins. It is difficult enough to get an accurate measure any way and if you introduce another factor as a boot heel, that makes it more difficult. We have had to throw out thousands of measurements on that account, because they were taken with shoes on. They are worth nothing to us.

Dr. Gulick.—It seems to me that so scientific a man as Mr. Galton would not have taken that method unless he were satisfied with the results.

Dr. Sargent.—Does Dr. Gulick take his measurements in that way?

Dr. Gulick.—He does not. But I would not be willing to say a man makes a mistake who takes them that way.

Dr. Sargent.—Would you make body measurements over the clothes?

Dr. Gulick.—No, but I would not criticize a man who did, if I knew he was a scientific man.

Dr. Sargent.—I do not mean to criticize. But even now I cannot help thinking that some of his measurements have been taken without shoes.

Dr. Hall.—Most of us who have had any experience in taking measurements have found it difficult to overcome errors of observation. In girth of chest after we have taken all possible care in adjusting the ribbon in the same place, over the same landmarks, comes in the question of tension, and where there is a large amount of adipose tissue that is an important question and the slightest difference in tension may make a whole centimeter of error in observation. It is almost an impossibility to get the same tension every time. I do not doubt that by taking careful measurements of the shoe heel, we should come as near to the right height as when we disregard the thick mat of hair on the head. I was taught to take the measure of the knee by putting the board underneath it. After measuring the same individual successive times I found the error of observation was very great, making the measure unreliable. I have therefore taken a bony landmark. I should be willing to take Mr. Galton's measurements.as he takes them.

Dr. Sargent.—Why would Dr. Hall be willing to accept his method of taking the height of the body and not his method of getting the height of the knee? When this measurement was first taken in this country by Dr. Bowditch and others, it was taken with the pupil sitting on a box with his feet hanging down to a foot rest. The distance was measured from the top of the box to the sliding foot rest. We adopted it so as to compare our measurements with those already taken. We have adopted methods of measuring other parts for similar reasons.

PHYSICAL CULTURE IN THE PUBLIC SCHOOLS OF KANSAS CITY, Mo.

CARL BETZ.

In order to fully understand and appreciate physical training in the Kansas City schools it is necessary to be familiar with our plan of instruction and supervision.

Physical training was made obligatory upon pupils and teachers in the Kansas City schools in 1885.

When I presented my plans to the Board of Education of Kansas City in 1885, I was thoroughly convinced, and am to-day more than ever, that if physical culture was ever to become a potent factor in American education it would have to be made obligatory in the city and country public schools, for in these are developed the masses of American youth. It was then and to this end that I prepared and in part had published, what is known as The System of Physical Culture, which bears my name. The books comprising it are as follows: Published. First book—Free Gymnastics and Free Gymnastics, (for ungraded schools). Second book—Tactics. Third book—Light Gymnastics (dumb-bells, Indian clubs, etc). Ready for the press. Fourth book.—Popular Gymnastics (out-of-door sports). In preparation. Fifth book—Heavy Gymnastics (stationary apparatus). Sixth book—Plays and Games. Seventh book—Fancy Gymnastics, (for entertainments, etc.).

Of the books published seven thousand are now in use in the United States. Each of the manuals is complete in itself and while they bring the art and the science of gymnastics within the grasp of the average school teacher, they do not in any way antagonize the individuality of the most ambitious professional gymnastic teacher.

The economical feature of the Kansas City plan of instruction in gymnastics which makes the introduction of physical exercises possible even into the smallest district school is one of especial merit. The system once wide spread, the patrons of the schools, the farmers as well as the city people, will soon become familiar with gymnastic exercises and will learn to discriminate between educational physical exercises and pugilistic and kindred sports.

This, more than anything else, will aid in breaking down the barriers of prejudice that so long have kept physical culture from the masses of the American people.

Our system of exercises in the main is the German system, although certain features of other systems, notably of the Swedish, are encouraged, and allowed to develop in the schools.

American plays and games of educational merit are given preference over those of other nations.

The Kansas City system of physical training, at the present stage of its development in the schools, comprises the following exercises,—all of which are known as disciplinary exercises.

I. *Free Gymnastics.*--(a) By word of command; (b) With music; (c) With singing (the singing by another class); (d) With breathing exercise.

II. *Light Gymnastics.*—(a) Long wands; (b) Short wands; (c) Dumb bells; (d) Rings; (e) Indian clubs. Without and with music.

III. *Tactics.*—(a) Plain marching without accompaniment; (b) Plain marching with castanets; (c) Plain marching with singing; (d) Plain marching with music; (e) Plain marching to the beat of the drum; (f) Fancy marches with music; (g) Fancy marches with singing; (h) Fancy steps with music; (i) Fancy steps with singing; (j) Fancy steps with castanets; (k) Marching with free gymnastics.

IV. *Popular Gymnastics, Out-of-door Sports and all Competitive Exercises.*

Exercises for Boys.—1. Fast walking; 2. Running; 3. Standing long jump; 4. Running long jump; 5. Hop, skip and jump; 6. Standing high jump; 7. Running high jump; 8. Pushing the pole; 9. Pushing wands; 10. Pulling wands; 11. Tug of war; 12. Pitching the stone; 13. Throwing quoits; 14. Ring-toss; 15. Bean-bag; 16. Ball games; 17. Lifting and carrying; 18. Wresting the wand; 19. Wrestling.

Exercises for Girls.—1. Fast walking; 2. Running; 3. Long rope jumping; 4. Short rope jumping; 5. Double rope jumping; 6. Circular rope jumping; 7. Throwing grace hoops; 8. Ring-toss; 9. Bean-bag; 10. Ball games; 11. Carrying sand cushion on head.

V. *Outings.*—Excursions into the woods, etc., etc.

VI. *Fancy Gymnastics.*—Public exhibitions at the close of the school year.

In addition to these exercises, it is my intention to introduce into the schools, as soon as practicable, gymnastic exercises on stationary apparatus. The large and spacious, airy and well-lighted attics of all the new school buildings will be utilized for this purpose.

When this has been accomplished our schools will have a complete system of physical training, meeting, reasonably, all the requirements of modern physical education.

For the most part all our gymnastic exercises are taken in large, airy halls, or on the playgrounds. The class rooms are used only when there is no other alternative, and then they are thoroughly ventilated during the exercise. Each and every class in the Kansas City school district has a *daily* physical exercise of not less than ten minutes' duration. In the lower grades *free gymnastics*, in the higher grades *light gymnastics*, constitute the basis of the work. Marching drills are given daily in all of the grades. Whenever the schools are called or dismissed, the pupils march into and out of the buildings in a body, in military order, keeping time and step to the beat of a drum. As often as the weather permits, principals give their schools, in a body, a short calisthenic drill on the play-ground before passing into the building. Ten minutes of the afternoon recess are devoted to out-of-door sports. Boys and girls exercise in separate divisions, each grade forming a group by itself The principal directs and supervises the exercises, his teachers assisting him.

The teachers and principals of the schools receive instructions from the director of physical training in sections or in a body, by grades or schools, as best suits the plans and purpose of the director. In addition to these direct instructions, the teachers are supplied by the Board of Education with manuals which contain the principles and elements of gymnastics. They also receive a definite outline of work for each school term (three months). Each teacher gives the gymnastic lessons to her class according to the instructions of the director.

This rule is imperative. The principals conduct all exercises where the whole school works in a body. No pupil is excused, even partially, from the exercises, permanently, unless it be at the request of a physician.

The director of physical training visits the schools as often as a division of his time among all the schools will allow. At the present time, this is once in four weeks. As yet we have no professional assistant teachers in the department. By order of the

Board of Education, the principals of the schools act as assistants, *i. e.*, they are responsible to the director for the work in their respective schools.

Classes and schools are inspected and examined in gymnastics by the director once each term. The following circular sent to the teachers at the last examination will illustrate how these examinations are conducted:

Work.—See outline for second term.

Rules and Regulations.—1. Teachers conduct the drill. 2. Teachers make their own selection of exercises. 3. The time not to exceed five minutes in the 1st grade, seven minutes in the 2d grade, and ten minutes in the grades above the second. 4. No class will be excused from the examination. If a teacher is absent, or her room in charge of a substitute, the principal will either drill the class himself or appoint one of the other teachers to conduct the exercise. 5. The number of points new teachers receive will not be included in the grand total until the next examination.

The drill without appliances should include.—1. Arranging the class. 2. A short drill on positions. 3. A breathing exercise. 4. The gymnastic exercises. 5. Marching and facing. 6. Dismissing the class.

The drill with appliances should include.—1. Arranging the class in the class-room. 2. Marching the class into the hall. 3. Taking the apparatus. 4. Arrangement of the class for the exercise. 5. Positions. 6. Gymnastic exercises. 7. Replacing the apparatus. 8. Marching the class into the class-room. 9. Dismissing the class.

Criticism. See "Points of Criticism." Highest number of points in 1 and 2 grades 45 (50). Highest number of points in grades above the 2 grade 50. Highest number of points for school exercises 5.

The teachers receive from the director a carefully prepared criticism of their work. The reports plainly show where the teachers failed, or in what particular parts of their drills they were deficient. The rules for criticising examination drills are given in the following circular:

POINTS OF CRITICISM. (ABRIDGED)

1. Arranging and dismissing the class. 2. Stillness of person. 3. Steadiness of features. 4. Promptness in obeying commands.

5. Correct positions and movements. 6. Uniformity of motion. 7. Quietness. 8. Energy. 9. Grace. 10. Marching. 11. Using correct commands. 12. Difficultness of exercises. 13. Variety of exercises. 14. Manner of conducting the drill.

At the close of each examination the schools are ranked according to their proficiency in gymnastics. This report is printed and sent to the schools.

The competition among the schools to excel in physical exercises is, in my opinion, if carefully and judiciously controlled, an excellent means for maintaining the interest in the work.

The following is the report of the last term examinations in gymnastics.

RESULT OF THE SECOND TERM EXAMINATION. (ABRIDGED).

Exercises presented by the teachers for examination.—Free gymnastics, by word of command; Free gymnastics, with music; Marching, by word of command; Marching, to the beat of a drum; Marching, to music; Marching, with singing; Tactics; Fancy steps; Dumb-bell exercises; Short wand exercises; Long wand exercises; Ring exercises; Indian club exercises; Breathing exercises.

Highest number of points 50. The general average in 33 schools, 266 classes was 45.60 against 41.75 average for the first term.

In order to give the patrons of the schools an opportunity of seeing the gymnastic work done in the schools, an exhibition is arranged at the close of the school year in one of the opera houses. These exhibitions are very popular in Kansas City, and have been a revelation to many of what can be accomplished in school gymnastics.

The results of physical training in the Kansas City schools are clearly preceptible. Compared with former years: There is less boisterous conduct on the play ground, pupils move about in the halls and class-rooms with less noise and greater ease; during study and in the recitations the pupils are better able to fix their attention, etc. Especially prominent is the improvement in the carriage of our boys and girls.

Teachers, too, have gained by giving the gymnastic instruction. Being compelled through circumstances to take hold of the work and held responsible for their teaching, they have become excellent disciplinarians. In their effort to control perfectly the physical natures of their pupils, they become conscious of their own defects and weaknesses in their governing powers, and consequently their ability to govern and to secure and hold the attention of their pupils has been greatly increased. It seems to me as if physical culture has changed the very atmosphere in our schools, and many of them have attained that charming state where the observer fails to detect any of the various means employed in securing perfect order.

As yet, we have taken no bodily measurements in the schools, solely on account of the inability of the department to provide the necessary means, time and assistance. Unless such measurements are conscientiously and accurately taken, and carefully and consistently compiled, they would be absolutely worthless. The science of anthropometry will require much time for its development in the schools. There is no doubt, however, that the general state of the health of our school children has been improved by the constant gymnastic drills. Of no less importance are their wholesome effects on the morality of the youth.

It should be remembered, however, that our system of physical exercises is not calculated to cure sickness, disease and deformity, but rather to prevent these abnormalties of the human body. With our system of gymnastics we aim to maintain and perpetuate health and strength, not only of the individual but of the whole nation.

[It is greatly to be regretted that abridgement of this paper was necessary, and also that lack of space forbids the publishing of the Syllabus of gymnastic work which accompanied the paper.—SECRETARY.]

Dr. Sargent read the following letter from George Brosius, director of the Normal Training departments of the German American Gymnastic Union:

NEW YORK, April 2, '91.

PRES. D. A. SARGENT, M. D., BOSTON, MASS.:

My Dear Sir—I regret sincerely that it is impossible for me to attend the meeting of the American Association for the Advancement of Physical Education. The nature of my duties is such that I can not allow myself conscientiously even so pleasant and profitable a time as your meeting would surely prove to be. Gladly would I contribute my share toward enlightening the citizens of Boston as to the value and importance of the German system of educational gymnastics. It would prove a real pleasure to me to again stand up for our good old system, which to me has no equal. My exalted opinion of the German system is the result of careful study, to which twenty-six years of my life have been religiously devoted. It has been my good fortune to witness its growth in this country from its infancy. I have been inspired by the words and actions of the men who defended and reared it ; and who unflinchingly stood the brunt of adverse criticism in order that humanity might reap the benefits of an education for which the pioneers of physical training so unselfishly fought.

That, dear Doctor, being the school for physical training in which I was reared, it is quite natural that our cause and system are sacred to me ; and that I may be able to prove a worthy pupil of my much beloved and most highly esteemed teachers is my highest ambition.

But notwithstanding the fact that to me the German system is by far superior to any other system, I think that the different methods of physical training, as long as they are based upon scientific principles, have much in common. They all tend to attain the same end ; the ways and means may differ but there that difference ends. We, who are the missionaries of this grand cause, should be actuated by nobler and less selfish motives. The fact that the country is awake to the necessity of bodily education, should be a source of gratification to all who are interested in the welfare of the American race. That physical training is forming a part of the curriculum of many of the public schools, colleges, and universities is of primary importance ; the method of instruction pursued, as long as it is an acknowledged system, and as long as the instruction is given by well-trained and competent teachers, signifies little. To be successful we must work together, for, "United we stand, divided we fall."

Wishing your meeting every success and sincerely regretting that my duties will not permit me to be present, I am

Yours for the Cause,

GEORGE BROSIUS.

THE MUSCULAR ELEMENT IN THE ETIOLOGY OF LATERAL SPINAL CURVATURE.

CHARLES L. SCUDDER, M. D.

By a lateral spinal curvature is understood a more or less permanent deviation of the spinal column, as a whole or in part, to either side of the median plane of the body, together with the resulting distortions of the trunk.

It is a deformity which, in its progress, runs a pretty definite course, beginning and ending during the first eighteen years of life, that is during the growing period. It is more common in girls than in boys. It is essentially a deformity of growth.

It is a deformity beginning then during school life and its tendency after the initial stages are past is to become permanent, fixing upon the child an almost irremediable deformity.

What is the cause of this deformity? Habitual faulty attitudes in sitting, walking, and standing cause a disturbance in the normal equilibrium of the spine.

The repeatedly assumed faulty attitudes permit the superincumbent body weight to fall in such a way as to make a permanent impression upon the soft bony frame work of the growing child, resulting in a lateral spinal curvature, or in a nut-shell, superincumbent body weight held persistently, by faulty attitude, out of plumb.

Along with the development of this more exact knowledge of the factors concerned in the production of lateral curvature, physical training is being gradually raised to the level of preventive medicine and preventive surgery. It is perfectly natural therefore that gymnastics should be applied to the prevention of the assumption of faulty attitudes in the early stage of this deformity. Given a lateral spinal curvature *already formed*, its treatment should come under the immediate direction of the properly trained orthopædic surgeon. But the prevention of this deformity is one of the duties or functions of the professional physical trainer. It is a *school* deformity. The etiological factor of importance practically then is the faulty attitude. But in the near future I hope to be able to deal with this aspect of this more important subject in detail.

With the introduction of systematic physical training into the Boston Public Schools, a large number of individual teachers are becoming more responsible than ever before for the prevention of spinal curvature in the children under their care.

The question arises, is the faulty attitude due merely to habit, or is there behind it a muscular weakness which predisposes to the bad position assumed and tending to its permanency. It is with a brief consideration of this muscular element in the etiology that we are at present concerned.

The value of most statements, hitherto, upon the muscular element, has been greatly lessened by an entire absence of carefully recorded facts. The muscular theories have been numerous. The following are the views held.

Guerin attributed lateral curvature to active muscular contraction. The muscles on the concave side of a curvature are actively contracted, and become permanently fixed in this position.

Malgaigne taught that lax ligaments and weakened muscles form the predisposing causes to spinal curature.

Bernard Roth* thinks that lateral curvature is predisposed to by weakness of the spinal muscles, combined with long-continued sitting or standing in stooping or relaxed positions. He has observed an inherited weakness of muscles and ligaments, associated probably with excessive softness of bones. He writes, "anything which weakens the muscular system tends to produce lateral curvature."

Adams† believes that in the early stage of lateral curvature the spinal muscles on both sides are, as a general rule, decidedly passive; but that as the curvature advances, the muscles on the convexity are called into increased action and serve the purpose of limiting the extent and preventing the increase of the spinal curvature.

Dr. L. A. Sayre‡ believes that rotary lateral curvature depends entirely upon abnormal muscular contraction. The spinal column is held in its normal position by the contractions of muscles situated upon either side of it, which should exactly balance each other. If, for any reason, one set of muscles overcomes the set upon the opposite side, the spine yields and a curve is produced with its concavity toward the side upon which the stronger set of muscles is situated. Dr. Sayre differs from Adams, therefore, in placing the strong muscles upon the opposite side of the body.

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*The Treatment of Lateral Curvature of the Spine with Appendix. Bernard Roth, F.R.C.S. London: H. K. Lewis, 1889.

† Curvature of the Spine.

‡ Orthopædic Surgery.

Schreiber* believes that in the early stages of the scoliosis there are no changes in the musles. The muscular changes, he thinks, are due to long continued stretchings and disuse.

Eulenburg† holds that slight continuous muscular action is necessary for the maintenance of the upright position of the body. This action must be equal on either side of the spine. The most frequent cause of deviations of the spine is a disturbance of the power of the spinal muscles. By the frequently repeated passive torsion, necessary in assuming faulty positions, gradually the trunk muscles are weakened.

Lorenz ‡ is correct in his criticism of the Eulenburg theory, when he says that muscular insufficiency is quite a voluntary and unproven assumption.

Lorenz sums up his criticism by the statement that anatomically, pathologically and clinically there is no foundation for the theory of a disturbed muscular antagonism.

That there is an element of muscular weakness present in cases of lateral curvature, pure and simple, has hitherto been assumed.

Believing, as I do, that it has been pretty satisfactorily demonstrated that two important factors in the production of the deformity are (*first*) the superincumbent weight of the head, neck, upper extremities and trunk falling upon (*second*) a spinal column which is out of plumb, the question arises, What position should the muscular factor occupy in the etiology? Is the assumption of muscular weakness in cases of lateral spinal curvature justifiable?

Before being able to determine the presence or absence of muscular weakness, it is necessary to establish a standard of strength for the back muscles for each age of the growing child. In order to establish this standard I have made an examination of the backs of one thousand one hundred and forty-one of the school girls of Boston. There was constructed for these examinations a chair with hinged and movable back, at right angles to a seat slightly inclined from the floor and long enough for the child to comfortably rest the legs upon. The back, at the level of the shoulders, is connected by stiff rods to the handle of a dynamometer, graduated in kilogrammes and fractions. Attached to the back of the chair is an upright with a cross-piece, movable up and down, by means of which the height both standing and sitting was taken.

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*Orthopædic Surgery.

†Real-Encyclopädie: Bd. 11, p. 560, under Rückgratsverkrümmungen.

‡Pathologie und Therapie der Seittichen Rückgratsverkrümmungen, Wien., 1886.

Each child was in turn weighed, and her height taken both standing and sitting. Then upon sitting in the chair, a strap was passed over the hips (to prevent slipping forward), the arms were folded, and the child forcibly extended her back upon the thighs. The back of the chair was then raised to above the level of the occiput, and again the muscular strength was taken—this time testing principally the trapezius and deep muscles of the neck and upper back. The muscles used in the first test are chiefly those of the lower back. The action of the thigh and leg muscles is as nearly as possible eliminated by raising the legs on the inclined seat. The amount of the pull or the strength of the back muscles is recorded upon the self-registering dynamometer.

There is found to be a gradual increase in the strength of the back muscles of growing girls with each year's increase in age from ten to nineteen. There were no marked cases of deformity amongst these children; and the results are taken to represent the average strength of the backs of growing girls, irrespective of nationality.*

SUMMARY OF OBSERVATIONS ON THE NECK PULL.

TABLE I.

Age.	Total Pull.	No. Observations.	Average Pull.
10	2933	163	17.99
11	4185	171	24 47
12	5924	228	25.98
13	6753	220	30.69
14	6258	183	34.19
15	3793	108	35.12
16	1961	51	38.45
17	442	11	40.18
18	258	6	43.00

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* See table 1, which records the observations made. Galtons method of Precental Grades I have not applied.

We possess then an index of muscular strength for each age in healthy girls from ten to nineteen.

Lateral curvature presents itself clinically in three stages. (1) The flexible cases in classes of cases whom voluntary effort will correct the deformity—(2) The partly rigid cases in whom voluntary effort will only partially correct the deformity—and the (3) completely rigid cases in whom permanent boney anchylosis exists and no amount of muscular effort serves to effect any change in the appearance of the deformity.

It is now necessary to measure the strength of the backs of lateral curvature patients during all stages of the disease from its inception—when it has been assumed by some that there is and by others that there is not muscular weakness present—to the period of osseous change, when it has been proven by autopsy that the spinal muscles are so altered or replaced as to have no contractile power.

These two groups of observations—*first*, of normal backs; *second*, of backs with lateral curves—when completed and compared, will demonstrate the presence or absence of muscular weakness in the different stages of lateral spinal curvature. It will thus be possible to determine the history of the muscular strength through the various stages of the disease. And the muscular element in its etiological importance may be discussed intelligently in one of its aspects.

The bearing of these results upon treatment.—Muscular exercise indiscriminately prescribed in cases of lateral curvature is irrational. The presence of habitual faulty attitudes does not necessitate the assumption of muscular weakness. The importance of determining the presence of muscular weakness and of measuring it, is greatest when the deformity is slight and the child is apparently strong. Treatment by posture and exercise is successful in the great majority of cases in the non-osseous stage. But I am convinced that the application of this treatment will be more rational if each case shall be compared with, what may be designated, the physical index of development. *The physical index for any child is the height and weight and strength which that child ought to have at its age, as determined by the tables of Bowditch and the table given above.*

From the researches of Dr. H. P. Bowditch, of Boston, it is known what the height and weight of growing girls should be at each age. It is known approximately, from the results of the investigation presented to you to-day, how strong the back muscles should be for each age. With these data at hand it is possible to determine whether a given patient is up to the standard of development or not. Special muscular exercise can *then* be prescribed when it has been demonstrated that it is needed. Mr. B. Roth's method of determining the need for muscular exercise is an excellent one, but with this additional test treatment is placed upon a firmer and more accurate basis.

The bearing of these results upon the recording of cases.—The ordinary method of marking results during the treatment of a patient, is by comparing the rotation tracings taken at intervals. In some cases, however, the rotation may remain constant, and yet the attitude of the child improve with the increase of muscular strength. The tracing, in such cases, will not be of great value. But a measure of the muscular strength at intervals will serve as a valuable index of progress. Then, again, in those cases in which there is no rotation present, by making measurements of the muscular strength at intervals the value of the muscular treatment will be demonstrated. And, again, in those cases in which the rotation diminishes by treatment, the tracing may be supplemented by a test of muscular strength

The bearing of these rusults upon the prognosis in individual cases.—A committee on lateral curvature of the spine, appointed by the Clinical Society of London, reported that "the amount of improvment which may be hoped for in any given case, may not unsafely be guaged by the improvement which the patient can voluntary effect (directed or helped by the surgeon) in her position when first seen."* In addition to this, the relation existing between the age, the height, the weight and the muscular strength of any given individual will assist in forming a prognosis.

There is, of course, a normal relationship between the several factors of the physical index. If, upon examining any given child, she is found to vary in any one or more points from the standard, it may then be considered whether this variation is to be taken as one of the etiological factors or not.

In conclusion, I have presented to you a statement of the commonly accepted theory of the cause of lateral spinal curvature.

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* See Clin. Soc. Trans., Vol. xxi, 1888, p. 301.

One of the supposed etiological factors, muscular weakness, has been considered in some detail and a scientific basis in fact, has been established for the study of the muscular element.

Suggestions have been offered as to the bearing of these observtions upon the treatment, the recording of cases and the prognosis of lateral curvatures of the spine.

DISCUSSION.

Dr. Bowditch.—At what age is lateral curvature most manifest?

Dr. Scudder.—It is seen at all periods of growth but is most commonly seen about the age of twelve or fourteen.

Dr. Bowditch.—That is interesting. The period of the most rapid growth of girls is from twelve to fourteen. They are then growing fastest at the age when they are most likely to have curvature of the spine. This has a bearing on the course necessary to adopt for girls to avoid this lateral curvature.

Dr. Scudder.—Lateral curvature occurs in boys but it is much less frequent. At the Children's Hospital there has been an experiment carried on to determine whether treatment was feasible in an outpatient clinic, the patients coming at long intervals. During the past year, of more than one hundred cases of lateral curvature I have seen two or three in boys, but none of them have I seen in the beginning stages.

Dr. Bowditch.—The most rapid growth occurs later in males than in females. Perhaps that is the reason why boys suffer less from lateral curvature.

Dr. Seaver, of Yale.—This matter of spinal curvature has been of considerable interest to me this last year. A patient of Dr. Scudder's was courteously placed under my care by him and while there was nothing specially unique in that case, yet in connection with that and others I have spent more time in studying spinal curvatures in connection with the college students than before. I had hoped to present to this Association a little instrument that I have devised for measuring spinal curvature not merely, but recording it so that we may on examination have such a record of a case as will give us a mathematical record of deviation from the right line. (Dr. Seaver here exhibited some of the records made by his instrument.) In connection with this matter of spinal curvature we have a good deal to learn and the work so far as it applies to gymnastics is interesting. There is a grand field before us and if we half try we shall discover something new. So it is a hopeful field to work in, for even the most inefficient will be able to do something. As to the frequency of spinal curvature I am surprised at Dr. Scudder's remark that out of a hundred children he found it in only two or three boys. Out of an examination of three hundred and fifty odd men between the first of October and Christmas almost six per cent had a lateral deviation from the right line of two centimetres or over, some a great deal more. That means, I believe, that back of the college course there was lack of physical development. For those of you working in preparatory schools this line of study is important. In connection with physical measurements we must get over some things that we have been doing for years past. This matter of measuring the height of the knee, it is one of the most absurd things in the world to think of measuring the height of the knee by bringing a rule up under it. I can make the height of my knee vary an inch and a half, measuring in that way. There are some cases where when the knee is bent at right angels there is total inability to relax the ham-string muscles. I find it is difficult for me to do it sometimes. I am not enough of a Delsartian to do it! To get a lot of measurements of a length of fourteen inches that you cannot get accurately within an inch is grave. It is as absurd as to take the standing height with the shoes on. Why under the heavens should men complicate matters when we ought to simplify them? In regard to apparatus I want to suggest to those who are making measurements that the measuring pole I have been using will enable you to take all the height measures on the Sargent list and do it just as accurately, in the time that you can possibly take the height alone with the Tieman measuring pole. If that is true aren't we fooling away a good deal of time? The ability to save time and energy and effort is what makes us civilized beings. It is that which enables a person who fifty years ago could only produce a yard of cloth at the spinning wheel and the loom to make fifty now in the same time by the aid of machinery. We must not be afraid of any new thing.

Dr. J. G. Smith.—Lateral curvature is not always due to lack of muscular development. In gymnasium work in an examination of one hundred and fifty boys I have noticed a good many cases of lateral curvature in the last two years. The majority of them were boys who were less active than the other boys who were examined. I would like to ask Dr. Scudder about this.

Dr. Scudder.—In looking back over the cases that I have known I cannot say that that is so. The class of cases that I have seen have been hospital and dispensary cases and I do not think they varied from the great classs of dispensary cases. But lateral curvature is not confined to the poorer class. It occurs among the well-to-do and those who have had all the advantages of careful and attractive home surroundings. I do not want the answer that I gave to Dr. Bowditch about the age and frequency of lateral curvature among girls considered as final or as giving the actual occurrence of lateral curvature; the exact percentage I do not know; that was my own observation only. There are primary lateral curves and secondary. A child who has had some trouble with the chest and the lung does not expand on one side because of previous trouble, will lean to one side or the other and lateral curvature will develop. A boy who has had his arm amputated above the elbow grows up with the weight less on this side of the body than the other and this is followed by curvature. A child who has had hip disease has one leg shorter than the other, the balance is disturbed, and there is compensatory curvature of the spine. We ought to distinguish primary from secondary curvature.

Dr. Sargent.—I think the attention of many members may have been called to acquired spinal curvature, because I know in my observation I have met a great many one-sided adults. This may be the result of military drill. Take the cadets at West Point. You can almost tell them from their peculiar development. Their work is with the right arm, and their fingers from handling the musket, are larger on the right hand. There is a tendency to curvature of the spine because the work is done with the right side. I presume the most of the cases we see in college are of this nature and not the result of muscular weakness.

Dr. Hall.—I think that most of us who have had opportunity to observe large numbers of what we call normal boys in physical examinations of schools, cannot have failed to notice that quite a proportion have one leg a little shorter than the other, and as the pelvis holds the base of the spinal column, it will start the spinal column a little to one side, and there will be a compensatory curve, so that when the length of the leg differs only a little, it is a thing of importance. I have seen a number of cases where the length of one leg was half or three-quarters of an inch more than the other. No accident had taken place that I could get any history of, and it must have been congenital. I have followed the practice of advising them to have the insole of the shoe built up where there was a difference of a quarter of an inch. If it was more than three-quarters of an inch, to build up the heel outside. They do not object to that and it overcomes the peculiarity of gait which can always be noticed with those people who have one leg shorter than the other. Though curvatures from that cause could hardly be called pathological they might be predisposing causes of that. I think they can well be looked after and remedied in this simple way.

Dr. Sargent.—I think that has been the practice of many physicians. I am glad to have these practical points brought out. As we progress in the work this side of the subject must receive more and more attention, and those who have the opportunity to observe are the ones to whom we should look for guidance in formulating methods of treatment. The treatment of spinal curvature by the gymnasium instructor, is a serious problem. About half are badly treated I think, and the treatment is as likely to increase the spinal curvature as to benefit the person.

Dr. Seaver.—Isn't it hard to tell just what exercises may meet the needs of a particular case?

Dr. Sargent.—Yes, for that reason I instruct my pupils not to treat the weaker side. They may be in danger of mistaking the real curve and the compensatory curve. It is not always easy for one without medical education to tell which is the real curve and which the compensatory curve. If they will adhere to the straight method and use the horizontal bar, and such apparatus, it is the safer way. You will not do the patients harm and you may do them a great deal of good. That is better than trying to treat one side alone. It seems to me that we should exercise great caution in attempting to treat spinal curvature in our gymnasiums.

Dr. Hartwell.—My belief is that such treatment is outside our province. I would not treat with ordinary gymnastic apparatus spinal curvature, unless it were very slightly developed. A teacher who discovers spinal curvature, should hand the case over to an experienced orthopædic surgeon. I think that teachers of gymnastics have done more harm than good in that class of cases, and that will continue to do so if they follow the old plan.

Dr. Sargent.—What would you do if fifty per cent. had traces of curvature?

Dr. Hartwell.—I would not treat them in the ordinary gymnasium with ordinary gymnastic notions and ordinary apparatus. It is a good idea that teachers should be able to recognize the beginning of a spinal curvature, but not for them to treat it as if they were specialists. That does mischief. I would not undertake to treat spinal curvature, unless I could devote myself to the special manipulation of the parts affected, and take carefully repeated measurements to test the effects of the treatment which is of a very special nature.

Dr. Seaver.—I believe a man would be liable before the law in a suit for damages, for malpractice, if he interfered with a case of spinal curvature that went badly under his treatment. I read a paper before the New Haven Medical society a week ago, in which I made the statement that there were not more than two physicians in the whole city competent to prescribe a course of physical exercise for a person with spinal curvature and nobody debated the point. The fact is that the medical body does not know anything about gymnastics. In Sweden it is different. Everybody knows something about gymnastics there, and the medical profession knows all about them we may say. Here our doctors are notoriously, men who do not take exercise, and do not recognize the need of it. They have not any idea of the inside of a gymnasium. You are fortunate here in Boston to have men like Dr. Scudder and Dr. Bowditch and Dr. Channing and others who are interested in making gymnastics a study. You are a center of intellectual influences and impulses, and your intellect has been turned in this direction, thank Heaven, and you are doing something. In general the medical profession is behind the times in this matter of physical development and training. They do not know what men have done. We are in the habit—I am—of saying to a patient, you go to the druggist and get this little hieroglyphic filled out and you will be well and happy, when we know that that man does not need medicine. In the matter of training for physicians we should use our influence to have the medical schools have a course of what may be called practical hygiene, or physical hygiene or some "high" sounding name, that shall teach these young men who go out among the people, something about the practical care of the body. Why, we all know that if the air contains a certain amount of carbonic acid gas it is not fit to breathe, but what do we know about the physiology of exercise as a scientific study? You doctors that know so much more than I do, know that there is not anything that is worthy of the name of a science that has been produced as yet. Now, I am hoping that some of you men, who have done so much work in fields that lie close to the field of physical training, will step over into this department, when you have cultivated your own field, and will produce somhthing for us that shall give us the results of your experience. Many of you are so fortunately situated that you do not have to make your profession a trade, as I do. You have opportunities for study, and for work outside, that broaden you and help you on. Now, do put in permanent form your experience and your knowledge. Do not let it die with you. We are hungry and thirsty for that sort of thing. Our line of work is so new, so young, that anything that will help us is encouraging. Many of you are able to do something that will be lasting. That will naturally react on the medical profession, and we shall have a broadening out of the medical mind that is notoriously narrow and jealous. We hate a man if he does not come up to our standard of medical ethics. We must get that standard so broad that we can see that a man may do good to a patient if he does not write a prescription. I am not sure but our friend, Dr. Hartwell's advice is wrong in regard to not touching these cases of spinal curvature. I believe we are studying this question in a careful way. I do not know many men, and I do not know *any* women who are reckless of this matter. I think we have been wonderfully careful, and I think we are going to be. I do not believe that the reckless people come in here, I know but one college that is disgraced by a trainer, a so-called professor, (though he hasn't a professorship except in his own mind,) who is doing this sort of work. He told me of it himself and I told him he ought to be shot. He said he had a fellow suffering from weak heart who had a great desire to be a runner, and, said he, "I prescribed digitalis for him." I said, "How did you dare do it"? He said he had a weak heart himself, and the doctor prescribed it for him, and he used the same old prescription. That man ought to be shot! He is connected with a college with over a hundred students, and he is teaching physical training! Think what mischief he may do! It is a disgrace, it is wrong. We ought to rise in our wrath and put down any such men; he does not belong with us. There is no danger of a man like Dr. Hartwell, treating spinal curvature. I would trust myself to him if I had it. He would not do anything wrong. His knowledge of medicine would prevent that if his knowledge of physical training did not. I am afraid that he is going to discourage many of you. But I say go on and do the best you can. You have so many cases you can not turn them all away, and many of you have not competent persons at hand to whom you can turn them over.

Dr. Sargent.—Physicians send these cases to physical trainers and often without giving any instructions.

Dr. Seaver.—That is true. I say, do not mistrust your abilities, but work on. If you do not know this year, try by all means to know next year. And ask advice. Why, men and women, talk with physicians about this matter and see if I underestimate their ability and knowledge. But read the best literature on the subject and talk with physicians whose opinions you respect.

Miss Hill of Wellesley.—Do you not think that the subject is broad enough to make a line between medical treatment and and gymnastic treatment, that we should not deal with the medical side of it? Then we need not divide our attention.

Dr. Seaver.—Yes, but that time will come when Yale will not ask us to earn a living outside of our work in physical training, by medical practice outside the college. It will be when Wellesley furnishes all the facilities and all the assistance you need. Oh, we are not going to die. We will work for that. We are everlasting.

Miss Ireson.—Suppose we were going to turn over our pupils with spinal curvature to the physicians then a great many would have to be turned over immediately. The question is, will the the gymnastic work that we do in the primary grades do any harm to a child with a tendency to curvature if we try to give an even development?

Dr. Hartwell.—That depends on the kind of work you give.

Miss Ireson.—That is quite true. But I understand you to say that any child who had any tendency in that direction should be turned over to a physician. In the primary and low grades the special teacher who has charge of that work cannot always stop to examine the back of each pupil to see if it has curvature. The question is whether simple gymnastics will do any harm.

Dr. Hartwell.—Usually not I suppose, in the beginning of scholiosis. But if you find a case well pronounced it should go to the physician. In Sweden they have physicians who examine the children twice a year. I believe teachers of gymnastics are also trained in the line of medical gymnastics usually. Frequently you find a group of children set aside from the ordinary gymnastics and given special work for special troubles. My plea is that in medical questions we should defer to medical men. The ordinary physician ought to be able to form some idea as to the danger of injury from gymnastic work; and also be able to tell when medical gymnastics are indicated. Even he cannot prescribe or regulate them.

Miss Ireson.—As we have no physician for the examination of the children what should you advise?

Dr. Hartwell.—I should say get the opinion of the physician in whom you have most confidence. Go to a specialist if you can. If you have a case of real scholiosis, it ought not to be treated by means of gymnastics without the advice of a physician.

Dr. Scudder.—I think the important point is this, that the causes of lateral curvature are only just beginning to be understood to-day. That work has been done by those especially interested in orthopædic surgery and is being developed by them. Meantime we are coming to understand the aims and methods and possibilities of physical education, and as our idea of physical education comes to be based upon more scientific ground, in so far will certain of the beginning stages of lateral curvature be able to be treated by the professional physical trainer. I think we are going to get to the point which they have reached in Sweden. Physical training is assuming more importance in the opinion of the people and we are getting to do it more thoroughly. Its introduction to the public schools is a great step in advance and the importance of that line of work in its bearing on lateral curvature is assuming practical shape.

Miss. Ireson.—If you have ten or twelve or fifteen pupils in a class you could easily detect these cases but if you deal with a mass, with fifty, seventy-five or a hundred, then unless we have an attending physician we should not know whether each individual was able to take the work. I find the majority of my pupils who have that tendency are those who have stood on one foot and leaned on the desk—those who have assumed faulty positions.

The resolution following Dr. Greenleaf's paper offered by Dr. Hartwell, was unanimously adopted.

Adjourned *sine die* at 12 M.

A. A. A. P. E.

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PROCEEDINGS

OF THE

AMERICAN ASSOCIATION

FOR THE ADVANCEMENT OF

PHYSICAL EDUCATION,

AT ITS

SEVENTH ANNUAL MEETING

HELD IN

PHILADELPHIA, PA.

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AMERICAN ASSOCIATION
FOR THE ADVANCEMENT OF
PHYSICAL EDUCATION.

SEVENTH ANNUAL MEETING.

THE seventh annual meeting of the American Association for the Advancement of Physical Education was opened in the Drexel Institute on Thursday evening, April 7, 1892. After music on the organ the association was called to order by James MacAlister, LL.D., president of the Drexel Institute, who made the following address of welcome:—

It is my pleasant duty to welcome the officers and members of the American Association for the Advancement of Physical Education to the Drexel Institute. And while I have no commission of any kind, I will also speak a word of welcome on behalf of the teachers and citizens of Philadelphia. We bid you a cordial welcome. I know of no educational body which should be more gladly received than yours. In no department of educational work have we been so neglectful as in that of physical education.

For nearly a hundred years the Germans have been leaders in physical education, and the rise and progress of American interest in bodily training is due very largely to the presence of large numbers of Germans in this country. This is especially true of the Northwest, where they have so largely settled, and where the gymnastic societies form so important a feature of their social life. What we have done ourselves has been mostly in connection with our higher education in college athletics. While I rejoice in the growing interest in field sports on the part of our young men and women, I strongly believe that we shall not get satisfactory results in physical training without that systematic education of the bodily powers which can only be obtained in the gymnasium.

I feel that we ought to welcome this association to Philadelphia because we have lagged behind in this important department of school work. In many of the Western cities, physical culture is now a part of the regular training of all the pupils of the public schools. In the East the first city to move in this direction has been Boston, and I shall look for a far-reaching influence from the success of the work in that city. There is need of a great awakening on this subject among teachers and educational authorities. We have yet to learn how intimately intellectual force and moral qualities are connected with a sound, wholesome body; we have yet to realize that the ideal of education is the harmonious development and training of all the powers and faculties of man's being,—body, as well as mind and heart.

This is the seventh annual meeting of this association, which was formed for the express purpose of promoting a deeper and more intelligent interest in the minds of the American people on this subject. I have no doubt that its deliberations at this time will be as instructive and as influential as heretofore in advancing the principles to which it is devoted. The meeting occurs most opportunely for the Drexel Institute. We have just completed a gymnasium which we believe to be one of the most complete in the country. One of the departments of the institute will be set apart for physical training, and we congratulate ourselves that the association has seen fit to come to Philadelphia and to honor the institute with its presence.

I take especial pleasure, therefore, on behalf of the Board of Managers, in extending a cordial welcome to the officers and members of the association; and I have now the honor of introducing to the audience the president of the association, Dr. Edward M. Hartwell, who will deliver the annual address.

President Hartwell replied as follows:—

Mr. President, Ladies, and Gentlemen: It gives me great pleasure to speak a word, on behalf of this association, of grateful thanks to the Drexel Institute and its management for the courteous invitation in accordance with which we hold our meeting here at this time. We congratulate ourselves that our seventh successive annual meeting opens under such favorable auspices. We count it a high honor to be the guests of this institute, which is not only one of the youngest but one of the broadest and noblest of the newer institutions of learning in our land ; and we count ourselves doubly happy in that we are enabled to meet in the hall of an institution which is actively interested—as has been shown by its plans, its preparations, and its deeds—in the cause which we have at heart. We meet in larger numbers and on a broader platform than has been the case at any previous meeting ; and we are encouraged on every side to believe that our association is growing in usefulness and influence. This occasion marks the formal opening of our proceedings ; though a goodly number of us have just come from Baltimore, where a most interesting "overflow meeting," so to speak, was held this morning.

Again I thank you, Mr. President, for the welcome extended to us, and will now turn to the less pleasant task of the annual address to the association.

PRESIDENT'S ADDRESS — THE CONDITION AND PROSPECTS OF PHYSICAL EDUCATION IN THE UNITED STATES.

BY DR. EDWARD M. HARTWELL.

According to a prevalent belief of long standing, the number seven is considered to be ominous and fateful. For instance, the human body is said to be renewed in all its parts once in seven years, and its life is supposed to be divided into seven periods or ages. In ancient Greece the boy was left in charge of his mother and nurse till he became seven years old. He was then handed over to the pedagogue and the pedotribe in order that his course of training, as an aspirant to citizenship, might be begun. Similarly in the days of chivalry, the boy was kept in feminine leading strings till he was seven years old ; henceforth his training was directed with an eye single to preparing him to play the part of a courtier and knight. He was

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Note.—This address has been largely rewritten since it was delivered.

removed from the sphere of woman's teaching, to a considerable extent, and was surrounded by influences calculated to make him an adept in manly sports and duties. To become a craftsman, the apprentice served his seven years; and seven years was likewise the period of training and probation for proficients in the liberal arts.

Following ancient usage, therefore, I venture to emphasize the fact that this is the seventh annual meeting of our Association for the Advancement of Physical Education. We may well congratulate ourselves, that though, as a corporate body, we are unquestionably larger and more vigorous than was the case seven years ago, few, if any, of those who were active in the establishment of this association have been cast out or have removed themselves to make way for new material. A glance at our list of members and the programmes of our meetings makes it evident that there is little prospect of our being removed from the sphere of woman's influence and suffered or required to run alone.

Having then, in a sense, arrived at a critical point in our history it behooves us to review the course of events within the field of physical education during the first period of our existence, and to forecast, so far as we may, the character and direction of the forces which are likely to be operative and influential in the period upon which we are entering.

Much has transpired during the infancy of this association that is worthy to be recounted in this presence. But, desirable though it be that the annals of physical education for the last decade should be compiled for the benefit of the public and ourselves, my purpose, at this time, is to discuss the significance, relations, and trend of the present movement for the advancement of physical training in the United States. I shall, therefore, content myself, at this point, with a cursory sketch of the principal events that have signalized the history of our cause during the past seven years.

Interest in problems pertaining to the physical side of education has never been so general, so active, or so intelligent in the United States, as it is to-day. Though that interest has continually gained in force and volume since the revival in athletics set in, after the close of the war, its spread has become much more rapid, and its manifestations much more widely diversified since the year 1884. Evidences of its extension are to be found in all parts of the country, under an increasing variety of forms. Within the period under review, the discussion by the general, the religious, the medical, and the educational press of the more superficial aspects of physical training has been notably enlarged. In certain quarters, likewise, a keener and more intelligent interest in questions relating to the scientific, historical, and pedagogical bearings of the subject has been awakened and fostered by publications emanating from the United States Bureau of Education, from this association, and from various other sources. At the same time not a little hubbub has arisen from various groups of would-be reformers and minor prophets, who are quick to scent an opportunity to call public attention to themselves and their crude and inept schemes for hastening the millennium.

In the field of superior and secondary education, the multiplication and improvement of material appliances have gone bravely on, and large sums of money have been expended on gymnasia, gymnastic apparatus, and playgrounds, and numerous colleges and preparatory schools, for both sexes, have established departments or *quasi* departments of physical training and personal hygiene. School boards, here and there, have shown a quickened sense of the need and value of bodily education, and a hopeful new departure has been made in the direction of establishing public education on a really sound foundation. Since 1884 cities aggregating an enrolled school population of more than 300,000 have taken steps towards providing instruction in gymnastics of one kind or another for the children in their elementary schools. In promoting this end, especially in the West, the N. A. Turnerbund has achieved more than any other organization or class of organizations. In the East an independent movement has arisen, with Boston as its center, for the promotion and extension of the Swedish system of pedagogical gymnastics. The battle of the systems has but just begun. Its earnest and prolonged continuance will in the main, I am confident, be productive of good results, as it cannot fail to bring out a large body of principles and facts which our educators as a class have ignored hitherto; and it is also likely to exercise an enlightening and humanizing influence on the too often uncritical and intolerant partisans of the systems and alleged systems of which we hear so much. Teachers that are not teachable are almost certain to prove false guides, and it is *teachers* and not mere gymnasts or expert foreturners that we must have if physical education is to win its proper place in the school and college world. Summer schools and a variety of nondescript "institutes" and "colleges" have shown marked activity in organizing what they are pleased to advertise as normal courses in physical culture. Of much greater consequence is the fact that several prominent normal schools have enlarged their curriculum by the appointment of special teachers of physical training, and other well established schools of the same kind are moving in the same direction. One of the most striking and hopeful signs of the times is the growing conviction that teachers and preachers of physical training require to be carefully and thoroughly trained for their work; and the measure of success attained by a few normal and training schools for the special teaching of the principles and practice of physical education, that have been started or re-formed within ten years, leads us to hope that this indispensable department of our work will in the future be much more adequately organized and supported. In this connection special mention should be made of the Turnlehrer Seminar in Milwaukee, the Physical Department of the International Y. M. C. A. Training School at Springfield, Mass., the Boston Normal School of Gymnastics, and of the extensive courses in physical training that Cornell and Harvard Universities have promised to establish in the near future.

The aims of the Young Men's and also the Young Women's Christian Associations throughout the country have been greatly enlarged, and their activity augmented within the last few years. The associations are to be congratulated on their success in multiplying new gymnasia and playgrounds, and commended for their zeal in striving to secure a higher grade of intelligence and efficiency for the direction of their "physical departments." A marked tendency on the part of public spirited philanthropists to provide the unfortunate and neglected classes with facilities for gymnastic and athletic forms of recreation has also declared itself. For instance, one of the Vanderbilts has built and furnished a gymnasium for the use of certain employees of the New York Central railroad; and a generous lady of Norfolk, Connecticut, has borne the expense of providing a costly and well-appointed gymnasium for the use of the Norfolk townspeople. The Park Commissioners of the city of Boston have taken a step that, I believe, is without precedent in this country, in the establishment and maintenance of a public out-of-door gymnasium for boys, and another for girls, at Charlesbank, a new park near to one of the most crowded quarters of the city. Another innovation worthy of mention is the activity shown by officers and men in organizing athletic sports and gymnastic instruction for the benefit of the rank and file, at several posts of the Regular Army of the United States. The use of gymnastics in retreats and asylums for the insane has also been recently revived. Emphatic acknowledgment should here be made of the wisdom and success shown by the management of the State Reformatory at Elmira, N. Y., in demonstrating the fact that systematic physical training is an essential and potent factor in the mental and moral reformation of criminal dullards. The pedagogical results of the Elmira experiments are of capital importance, and the progressive spirit shown by the government of the state of New York in providing generously for the establishment and maintenance of a department of physical training in its reformatory for felons is worthy of the warmest commendation. Would that even half of our school boards and boards of college trustees were equally progressive!

Being Americans and members of an American association for the advancement of physical education not yet in its teens, it is natural that we should be most interested in the present condition of physical education in the localities in which we are called to labor. The temptation is great to magnify the importance and extent of the present movement for extending the scope of physical training; and to measure our hopes for the future by the achievements of the last few years, in which many of the members of this association have borne an influential and honored part. It is easy to forget, therefore, the part played by our predecessors and to lose sight of the fact that the movement in which we are engaged is a composite and resultant effect of forces that have been operative in this country for nearly three quarters of a century and in Europe for more than a century. In order to adequately measure the advancement of physical training in this country during the last ten years or to forecast the prospects of its further advancement, it is necessary to consider some of the more characteristic features of the general movement for educational reform of which the movement for the advancement of physical education forms a part. Physical training is at most a province in the realm of human training, and the struggle for its advancement is but an episode in a general campaign. The main issues of that campaign were joined in the conflict that arose from the revolt of the Realists and Philanthropists against the Humanists in the revolutionary decades of the last century.

The political, social, and industrial revolutions that have been wrought within the last hundred years have done much to spread and popularize the ideals and methods of the Philanthropists ; and have contributed not a little towards forcing the Humanists to abate their somewhat arrogant and exclusive claims with regard to superiority of "discipline studies" over "information studies" ; in other words, scientific training has won, or is fast winning, a secure place for itself beside its present rival and former over-lord and master, "classical culture." It is not probable that permanent or absolute victory will be achieved in America either by the devotees of humanism or realism ; a much more desirable result is likely to be brought about; viz.: that the parties shall become so far united and reconciled as to work side by side for a complete human training.

In reviewing the history of the rise of physical training as a distinct department of modern education in Europe, five distinct periods are recognizable. They are : 1, the period beginning with the Renascence and the Reformation, and extending to the year 1774, a period in which bodily training aroused the theoretical and critical approval of various humanistic writers and reformers ; 2, the period extending from 1774 to 1820, which was characterized by innovation and experiment on the part of the Philanthropists and their followers; 3, a period of comparative quiescence and neglect, as regards physical education, covered by the interval between 1820 and 1840; 4, the period 1840 to 1860, which was a period of revival and expansion; 5, 1860 to the present time, a period of active growth and development on the whole, though a tendency to reorganization and reform has declared itself within the last decade.

The development of physical education in America has taken place along lines that are in general parallel to the course of the development of physical education in Europe. It may be divided roughly into periods as follows: 1. The period extending from the outbreak of the Revolutionary War to the year 1825; this was a period of premonitory criticism and slight theoretical recognition. 2. A period of enthusiastic discussion and of hopeful but short-lived experiments due to foreign example. 3. The period 1835 to 1860 was one of quiescence and neglect, marked by the beginnings of a reaction towards its close. 4. 1860 to 1880 was a period of awakening, revival, and experiment. 5. The period extending from 1880 to the present time has been a time of active growth and diversified expansion.

Let us now consider more closely some of the more salient features disclosed by the history of physical education in Europe and our own country.

The Humanists of the Renascence and the Reformation were inclined, owing to their reverence for the example set in ancient times by the Greeks and Romans, to recognize in a general and literary way the worth of bodily exercises and accomplishments, but they made no strenuous attempt to engraft physical training upon their reformed schemes of education. We might multiply citations from such writers as Rabelais and Montaigne in France, Martin Luther and Melanchthon in Germany, Milton and John Locke in England, to show their enlightened opinions with regard to the fundamental importance of bodily training. But it would be difficult to show that their writings led to any thoroughgoing attempt to realize their generous ideals prior to the last three decades of the last century.

To Basedow, the first of the Philanthropists, belongs the honor of making the first hopeful experiment in combining physical and mental education in the general training of youth. In 1774, he was instrumental in founding an institution at Dessau, which was called the Philanthropinum, for the purpose of realizing Rousseau's "method of nature." Twelve years before, Basedow had attempted to adapt to general educational purposes certain physical exercises that were peculiar to institutions set apart for the education of young men of gentle blood. These schools, which bore the name of schools for the nobility, or "Ritter-akademien," furnished instruction in riding, fencing, vaulting, and dancing. Basedow endeavored to make use of these knightly exercises in his scheme for educating the sons of the burghers. He also introduced certain forms of exercise derived from popular German sports. Simon, one of Basedow's assistants, induced him to make trial of certain exercises copied from the gymnastics of the ancient Greeks; thus arose the so-called Dessau pentathlon, which consisted of running, jumping, climbing, balancing, and carrying of heavy weights. Basedow's immediate disciples and imitators were Campe, Salzmann, and Guts-muths, who labored to extend and perfect the Dessau system of physical training, in which manual training was also given a place. As regards their efforts to promote physical training, Pestalozzi and Fellenberg in Switzerland, Nachtegall in Denmark, Ling in Sweden, and "Father Jahn" and Spiess in Germany may fairly be classed with the men above mentioned as followers of Basedow among the Philanthropists.

Pestalozzi has been called the father of education for the people. He attempted to devise a system of school gymnastics based upon the nature of the human body; and endeavored to combine industrial as well as general bodily training with mental and moral education in his experiments for the amelioration of the condition of the common people. Pestalozzi's attempts in the period 1780 to 1810 were practically failures. What he was unable to accomplish was largely realized by Fellenberg and his successors in the schools at Hofwyl near Berne between the years 1807 and 1848. Not a few of those who were engaged in educational reform, as marked out and attempted by Pestalozzi, became identified with the physical education movement. Among these we may mention Colonel Amoros, who in 1817 opened the first gymnastic institute in Paris. He had formerly been at the head of a Pestalozzian Institute in Madrid ; and it is noteworthy that Father Jahn and two of his nearest friends and helpers in the gymnastic movement, viz., Friedrich Friesen and Ernst Eiselen, were teachers in a Pestalozzian institute in Berlin. That gymnastics under the name of Turnen became a popular institution and a potent factor in national life was mainly due to Jahn, whose strong and rugged nature and restless, passionate spirit qualified him for agitation and leadership. During the time of Prussia's deepest humiliation and distress, in the period, viz. : 1806-1813, Jahn seized the idea of making physical training a force in national regeneration and education, and wrote, and dreamed, and plotted for a free and united Germany. He made gymnastics popular as a means of acquiring bodily force and skill; but, though himself a teacher of boys, his aim was not chiefly to develop a system of school gymnastics. He aimed at bringing boys and men together for gymnastic pursuits out of doors and out of school hours. The Turners were active in the successful uprising of the Prussians against the French in 1813, so that turning became more than ever popular throughout Germany during 1813 and 1814. In 1819 a plan was perfected by the educational authorities for the establishment of turning grounds throughout Prussia in connection with the schools for boys; but political troubles arose which caused the suppression of popular gymnastics in Prussia from 1820 till 1842. In 1842 the King of Prussia gave his sanction to the proposal of his ministers that "bodily exercises should be acknowledged formally as a necessary and indispensable integral part of male education, and should be adopted as an agency in the education of the people."

The king also authorized the establishment of "gymnastic institutes" in connection with "the gymnasien, the higher middle schools, the training schools for teachers, and the division and brigade schools in the army." The measures taken to give effect to the king's cabinet order of 1842 need not detain us here. Suffice it to say that not only in Prussia, but also in all other German states, and, indeed, throughout nearly all continental countries, gymnastics, since 1842, have become "a necessary and indispensable integral part" of the school training of boys, and to a large degree of girls also.

Unquestionably, Jahn and his followers prepared the way for the rise of the present widespread system of German school gymnastics, which, in addition to some heavy gymnastic features borrowed from the Jahn turning, includes free movements, order movements, and class exercises in light gymnastics that have been invented or adopted since Jahn's time. The most prominent name in connection with the rise and spread of German school gymnastics is that of the Hessian, Adolf Spiess ; whose distinctive work it was to render German gymnastics systematic and scientific, and to adapt them to pedagogical purposes and methods. Spiess was chiefly active and influential as a teacher and writer between 1840 and 1858, the year of his death. The normal schools of gymnastics at Berlin and Dresden were founded prior to 1860, while those at Munich, Stuttgart, and Carlsruhe are of later date.

Although traces of German influence may be found in the early work of Ling, the founder of Swedish gymnastics, he soon opened paths of his own, and some of the most distinctive features of the system of school gymnastics now in vogue in Sweden are rightly accredited to Ling, who held the position of director of the Royal Central Gymnastic Institute in Stockholm from its foundation in 1813 till his death in 1839. Ling worked out the principles of free movements and of class exercises in advance of Spiess.

Since 1840, and more particularly since 1860, Germany has become the stronghold of Volks-turnen or popular gymnastics,—even as England has become the stronghold of athletic sports,—so that now the turning societies of Germany and Austria number nearly 5,000, with an aggregate membership of nearly half a million men and boys over fourteen years of age. Despite the excellence of the Ling gymnastics for school and military purposes, popular gymnastics have remained comparatively undeveloped in Sweden. In Norway, Finland, and Denmark gymnastics are more generally popular than in Sweden and show the traces of German influence and example to a considerable degree. Since 1884 a wide and influential movement has arisen in Germany whose purpose is to utilize popular sports in the physical education of school children. This movement has met with marked favor and active sympathy from the teaching class and the educational authorities. In France a very general movement is in progress to acclimatize British athletic sports; and a strong party exists in Sweden whose aim it is to popularize gymnastics by the incorporation of athletic features and methods that have heretofore found little favor. On the other hand, while school gymnastics in Switzerland, Austria, Denmark, Russia, Italy, England, and even in France have followed or resembled German school gymnastics in the main, a tendency to adopt or approximate Swedish methods has recently begun to declare itself in France, Denmark, Russia, and England, as well as in this country.

Turning to America we find our prehistoric period, or the period in which the literary recognition of physical education began to manifest itself, did not close until the first quarter of the present century. It corresponds, then, in point of time, roughly with the period of preliminary experiments in Europe. During this period Americans were too busily engaged with war and politics to pay much attention to matters pertaining to educational reform. Still, there were not lacking, even before the year 1800, influential and outspoken critics of what then passed for a liberal education. Among such we may mention Benjamin Franklin and Benjamin Rush, both of Philadelphia, and both signers of the Declaration of Independence, and Noah Webster, the founder of the dictionary. It is clear that both Rush and Webster held views decidedly favorable to bodily exercise of certain kinds.

Noah Webster seems to have been the first American of note to propose the institution of a college course of physical training. His proposal was, however, of a rather rudimentary nature. It is found in his "Address to Yung Gentlemen," dated Hartford, January, 1790. He says it should be "the buzziness of yung persons to assist nature, and strengthen the growing frame by athletic exercizes. . . . . When it iz not the lot of a yung person to labor, in agriculture or mekanic arts, some laborious amusement should constantly and daily be pursued az a substitute, and none iz preferable to fencing. A fencing skool iz, perhaps, az necessary an institution in a college az a professorship of mathematics." He further recommends running, football, quoits, and dancing as suited to the needs of sedentary persons.

Among Dr. Rush's published essays is one dated in August, 1790, "On the Amusements and Punishments Proper for Schools." In it he proposes that "the amusements of our youth shall consist of such exercises as will be most subservient to their future employments in life." He favored agricultural and mechanical employments as means of diversion and training, and notes with approval that "in the Methodist College in Maryland a large lot is divided among the scholars and premiums are adjudged to those who raise the most vegetables." "The Methodists," he adds, "have wisely banished every species of play from their college." Again he says, "All the amusements of the children of the Moravians at Bethlehem, Pa., are derived from their performing the subordinate parts of several of the mechanical arts." It was in accordance with such notions as these that farm, manual labor, and Fellenberg schools were founded, and societies for promoting manual labor in literary institutions were organized somewhat extensively, in various parts of the United States during the first third of the present century.

The prominence given to military considerations in many of the earlier and some of the later attempts to make a place for physical education may be noticed here. Bodily accomplishments have ever been assigned a prominent place in the codes of the soldier and the gentleman; and every outburst of military ardor in our history has led to attempts to engraft certain technical forms of military training upon the general training of the rising generation. The War of the Revolution, the War of 1812, and the War of the Rebellion each gave rise to such attempts.

In 1790, President Washington transmitted to the First Senate of the United States an elaborate scheme prepared by Gen. Henry Knox, then Secretary of War, for the military training of all men over eighteen and under sixty. The youth of eighteen, nineteen, and twenty years were to receive their military education in annual camps of discipline to be formed in each state, and a certificate of military proficiency was proposed as a prerequisite to the right to vote. This plan failed of adoption as did also the following recommendation that was urged in the national House of Representatives in 1817 and 1819, "*that a corps of military instructors should be formed to attend to the gymnastic and elementary part of instruction in every school in the United States.*" In 1862, Congress made the teaching of military tactics obligatory on all state colleges that should avail themselves of the Morrill Act, whereby certain public lands were apportioned among the several States for the purpose of promoting education in agriculture and the mechanic arts. In 1864, a plan recommended by the State Board of Education for making military drill a part of the public school training of boys throughout the state narrowly escaped adoption by the Legislature of Massachusetts.

Excepting the Military Academy at West Point, in whose curriculum bodily exercises have figured more or less largely since 1817, the "American Literary, Scientific, and Military Academy," founded at Norwich, Vermont, in 1820, by Capt. Alden Partridge, formerly superintendent of West Point, seems to have been the first educational institution of note in America to attempt to connect "mental improvement with a regular course of bodily exercises and the full development of the physical powers." The example of the West Point and Norwich academies proved mildly stimulating, and led to the establishment of perhaps a score of select military schools for boys in the course of thirty years, but, so far as I know, that example had no effect upon the development of the public school system of instruction in any city or state. The impulse which led to the gladsome advocacy and espousal of physical education in the second quarter of this century was distinctly humanitarian in its nature.

The movement for educational reform in Europe made but slight impression upon American thought and endeavor until after the close of the War of 1812. But the United States shared markedly in the exalted and restless mental activity which characterized the first two or three decades following the battle of Waterloo. This period was peculiarly prolific in optimistic schemes for the amelioration of popular ignorance and misery ; and American reformers became highly susceptible to the influence of foreign example, and developed a well marked aptitude for laudation and imitation. In the years 1825 and 1826 physical education became a matter of almost epidemic interest in New England; Boston in particular was a focus of infection. Although, as I shall point out, the attempt was definitely made to introduce gymnastics into a number of colleges and private schools for boys, physical education was very vaguely apprehended, as it was often held to include pretty much all that is now relegated to the department of personal hygiene. Physical education fired the imagination of educational reformers for a time,—but so did monitorial instruction, manual training, the propagation of useful information, vegetarianism, teetotalism, and phrenology.

The Round Hill School, established at Northampton, Mass., in 1823, and the High School, founded in New York city in 1825, each introduced many features that were novelties in the education of American boys; but the most striking innovations by which these schools were marked were copied from Lancasterian, Fellenbergian, or Pestalozzian schools in Europe. Physical training was accorded a place both in the Round Hill School and in the New York High School, which schools constituted a sort of *stella-duplex* in the educational firmament, and served for some years to fire the emulation of a host of aspiring and enterprising pedagogical adventurers. As regards physical education the Round Hill School was decidedly the more refulgent. Although a rude attempt at gymnastics was made in the Monitorial School for Girls in Boston early in the spring of 1825, I know of no reason to dispute the claim of Messrs. Cogswell and Bancroft of Round Hill that they "were the first in the new continent to connect gymnastics with a purely literary establishment." The Round Hill gymnasium was established in 1825. It was in reality a *turn-platz* or outdoor gymnastic ground, planned, fitted, and managed in accordance with the Jahn system of turning then prevalent in Germany, and to a much less extent in England. Dr. Charles Beck, who was "Instructor in Latin and Gymnastics" at Round Hill, had been a pupil of Jahn himself, it is said. Gymnastics continued to be a feature at Round Hill for several years.

Harvard College started the first American college gymnasium in one of its dining-halls in March, 1826; and later in the same season a variety of gymnastic appliances were put up in the playground, known as the Delta. Dr. Follen, a German exile familiar with the Jahn turning, was the instructor and leader in gymnastics. The Boston Gymnasium, opened in the Washington Gardens, October 3, 1826, with Dr. Follen as its principal instructor, seems to have been the first public gymnasium of any note in the United States. In July, 1827, Dr. Francis Lieber, who was warmly recommended by his old teacher and friend, Father Jahn, succeeded Dr. Follen. It is said that the attendance at the Boston Gymnasium rose to four hundred in the first year and dwindled to four in the course of the second year. Gymnastic grounds were established at Yale in 1826; and at Williams, Amherst, and Brown in 1827. Did time permit a dozen schools might be named that were established in the period 1825-1828 for the sake of giving effect to the reformed principles of education. Doubtless a much larger list might be made but for the meager and chaotic character of the educational annals of the time in question. As it is, my list comprises only such institutions as have left us printed evidence of their profession of faith. Only one of the twelve was properly speaking a public school. All of them promised and some of them furnished facilities of a sort for the physical education of their pupils. The day of normal training had not come, and, so far as I know, no attempt whatever was made to train up teachers of gymnastics in a systematic, rational way!

The public school system of the country was still in embryo. The current conception of "common school education" was so mean and narrow, and the teaching class, at least outside of the colleges, academies, and better private adventure schools, was so largely made up of inferior and incongruous elements that we need not wonder that the interest in physical education, in the second of our five periods, proved to be illusory and short lived, and exercised almost no influence in the field of popular education. What had been heralded as a new era in physical education in 1825 was practically closed by 1830. What might have been the result if Drs. Beck, Follen, and Lieber had not quit the field it is vain to surmise. Even they were ruled more by theoretical notions of human perfectibility than by scientific knowledge of bodily health and development.

No general or widespread revival of interest in school or college gymnastics occurred between 1830 and 1860 ; and athletic sports had no standing either as an elective or compulsory branch of education. Still, what was loosely termed "physical education" continued to receive marked attention. A considerable party arose who favored manual labor instead of gymnastics, and a number of enthusiastic attempts were made, prior to 1835, to provide college and seminary students with facilities for gaining health, recreation, and cash by means of agricultural and mechanical labor. Voluminous and curious evidence of this exists, particularly in a report of Mr. T. D. Weld, the general agent of the Society for Promoting Manual Labor in Literary Institutions. The society was founded in 1831, and Mr. Weld's report was published in 1835, or thereabouts.

Among the multifarious and heterogeneous stirs and movements for the regeneration of society which constitute so marked a feature of the first third of the present century, the crusade for popularizing the doctrines of physiology is especially worthy of our notice, since it served to keep alive and in some measure to spread a vague theoretical interest in physical education, as it was then superficially conceived. Indeed, it is not too much to say that the physiology-crusade served to perpetuate the essential spirit of the period 1825-1830 and had much to do with preparing the way for the gymnastic revival that set in just before the war broke out. This crusade had its beginnings as early as 1825, or possibly earlier; it was greatly stimulated by the furor which was created by the books and lectures of the phrenologists Spürzheim and George Combe, who argued in a solemn and taking way that education should be based on the teachings of physiology and ordered in accordance with the alleged laws of their pseudoscience. It may be said to have culminated in the year 1850, when the Legislature of Massachusetts passed a law authorizing school committees throughout the commonwealth "to make physiology and hygiene a compulsory study in all the public schools." Through the multiplication of popular manuals of physiology, which frequently contained much hortatory and laudatory matter on physical education, the general public came to entertain a nebulous notion that serviceable bodies were worth striving for and that school machinery of some sort should be dèvised for the purpose of securing them. Did time permit, an interesting list might be given of lectures, addresses, and books that helped to propagate this notion. I will content myself with mentioning: Miss Catherine Beecher's "Course of Callisthenics for Young Ladies," published in 1832; "The Principles of Physiology Applied to the Preservation of Health and to the Improvement of Physical and Mental Education," by Dr. Andrew Combe of Edinburgh, a pirated edition of which was published in New York in 1834; and Horace Mann's "Sixth Annual Report, as Secretary of the Massachusetts Board of Education," published in 1843. Miss Beecher was a precursor of Dio Lewis as regards the advocacy of free and light gymnastics and musical drill, and appears to have been the first native American to assert claims to originality as a "system-maker." Her system seems to have awakened some mild and passing attention in the proprietors of private schools for girls. In the preface to her "Manual of Physiology and Calisthenics for Schools and Families, New York, 1856," Miss Beecher professes to be a disciple of Ling; but the body of the book is not written in accordance with the distinctive principles of the Swedish gymnasiarch.

Very little attention was bestowed by Americans upon German gymnastics in the period 1835 to 1860, which period as a whole was one of ground breaking and seed sowing as regards physical education. In the North American Turnerbund we have a genuine and vigorous offshoot from the German stock, but the transplanting of that sapling and its cultivation in American soil failed to excite the interest of American educationists for more than a generation. The beginnings of the Turnerbund, which for many years has been the largest, most widespread, and efficient gymnastic association in the United States are to be found in the Turnvereine established by political refugees from Germany, who found an asylum in this country after the revolutionary year of 1848.

We have abundant evidence that there was a growing interest in gymnastic and athletic forms of exercise in the latter half of the decade ending in 1860. Such evidence is found in the effort to secure funds for the erection of school and college gymnasia ; in the increased addiction of collegians and others to rowing and ball matches ; in the instant popularity achieved by the Tom Brown books; in the interest excited by the lectures and exhibitions of Dr. G. B. Windship, whose public career as an exponent of heavy lifting began in Boston in 1859; and in the prominence given to topics relating to physical education in general, and school gymnastics in particular, by speakers at teachers' conventions and institutes, by the conductors of educational journals, and by public school officials.

The Gymnastic Revival of 1860 may be said to date from the meeting of the American Institute of Instruction at Boston in August of that year, at which meeting Diocletian Lewis, commonly called Dr. Dio Lewis, took a prominent part in the discussion as to the expediency of making "calisthenics and gymnastics a part of school-teaching." This revival was not a thing apart, but grew out of the crusade for popularizing physiology and hygiene, if, indeed, it be not better described as a phase or continuation of that crusade.

It was wholly natural that Dio Lewis should figure in both movements. He was by nature an enthusiast, a radical, and a free lance. He was born and bred at a time when advocacy of the doctrines of temperance, anti-slavery, phrenology, homœopathy, physiology, and of educational reform savored more or less of ultra-liberalism, or even of "free-thinking." Before his first public appearance in Boston, when he may be said to have stormed the key to the situation, by his capture of the American Institute of Instruction, Dio Lewis had traveled extensively, for some years, in the Southern and Western States, as a week-day lecturer on physiology and hygiene, and as a Sunday orator on temperance. He had given some attention to physical education, withal; and, being well versed in the arts of the platform, was quick and apt in taking advantage of the growing interest in gymnastics. He was unconventional, sympathetic, plausible, oracular, and self-sufficient; and the time was ripe for a gymnasiarch of that sort. The doctrines and methods of the Lewis gymnastics, which were novelties and seemed original to most of his followers and imitators, spread rapidly over the whole country, and, if we may credit certain eulogists of the system, even into "Europe, Asia, and Africa." His skill in securing the aid and backing of educationists and notabilities contributed materially towards making Dio Lewis the most conspicuous luminary, for a time, in the American gymnastical firmament, but failed to make him a fixed star. He was in great demand as a lecturer before normal schools, teachers' associations and institutes, and lyceum audiences; and his contributions to leading periodicals were eagerly read and favorably received. He was medical practitioner, lecturer, editor, gymnasium manager, teacher, hotel proprietor, and preacher by turns. In short, Dio Lewis was a revivalist and agitator, and not a scientist in any proper sense. His originality has been much overrated,—very few of his inventions, either in the line of apparatus or of methods of teaching, being really new. In his book he borrowed lavishly from German sources, so that his "New Gymnastics" were in the main neither new nor his own. The establishment by Dio Lewis in 1861 of the Boston Normal Institute for Physical Education was a really new departure—in America—(unless perchance the *Turnlehrer Seminar* of the North American Turnerbund antedated it), and constituted, perhaps, the most considerable and solid of Dio Lewis's contributions to the cause of physical education. He is also deserving of praise and credit for convincing the public of the utility of light gymnastics, and for his influential aid in popularizing gymnastics for school children of both sexes.

Teachers and school managers showed unexampled interest in the "New Gymnastics," which seemed destined soon to form a part of the curriculum of the public schools of the more progressive cities of the country, as well as in a multitude of private schools and academies. For instance, the School Board of Cincinnati, in 1861, and that of Boston, in 1864, formally adopted schemes looking to the general introduction of gymnastic teaching into their public schools. Owing to various reasons that I will not take time to enumerate, these and similar schemes proved illusory and impracticable. Even to-day we must admit that no important city or town in the United States has succeeded in maintaining for ten consecutive years a genuine and adequate system of school gymnastics.

The War of the Rebellion acted as a check to the spread of the interest excited by the Gymnastic Revival of 1860 in athletic and gymnastic forms of physical education, on the one hand, while, on the other, it served to bring military forms of drill and exercise into prominence and favor. In the year 1860 the colleges of Harvard, Yale, and Amherst erected gymnasium buildings; but their example was not followed to any considerable extent by the other colleges until after the close of the war. Amherst College established a department of Hygiene and Physical Education in 1860. Dr. Edward Hitchcock, Sr., who has served continuously as the professor in charge of that department since August, 1861, was elected the first president of this association in 1885. The example of Amherst, in making gymnastics a compulsory branch of college work, had but little effect upon the other colleges of the country prior to 1880.

The building of college gymnasia was resumed after the close of the war. During the decade after the war the disbanded armies of the republic furnished to the preparatory schools and colleges a large contingent of students who had been subjected to strenuous physical training. The influence exerted by this contingent in reviving and developing an interest in physical training was far more potent in the department of athletics than in that of gymnastics or of military drill. Baseball and rowing developed rapidly and led to the multiplication of intercollegiate athletic contests. The inadequacy of the facilities afforded by the older gymnasia for the indoor exercise and training of crews, teams, and champion athletes, had much to do with inaugurating a new era of gymnasium building, and with improving the organization and administration of the departments of physical education in the leading colleges for both sexes. This era opened in 1879-1880 with the completion of the Hemenway gymnasium at Harvard University. This gymnasium, for whose erection and equipment Mr. Augustus Hemenway of Boston, a graduate of Harvard in 1876, had given the sum of $115,000, surpassed in size, convenience, and magnificence any of the gymnasia then existing in the country. This gymnasium, both as regards its structural features, its fittings, and its methods of administration, has served as the model for most of the gymnasia, whether public or private, that have since been built. To Dr. Sargent, the director of the Hemenway gymnasium, we owe a debt of gratitude for many improvements in the construction of apparatus, for the invention of the so-called Sargent System of Developing Gymnastics, and the demonstration of the fact that gymnastic and athletic exercise on the part of young men and boys can and should be controlled and directed in the interest of healthful growth and normal development.

Thus far the colleges of the country have made no material advance over the method of gymnastic instruction adopted at Amherst thirty years ago, nor upon the Sargent idea of employing physical diagnosis and anthropometrical observations, in connection with the use of developing appliances, in the oversight and guidance of the physical training of students. Here and there the beginning of forward movements in promoting class-instruction in light and heavy gymnastics have begun to show themselves—in this connection honorable mention should be made of Bowdoin and Haverford colleges for men. Certain colleges for women, which have adopted Swedish pedagogical gymnastics, notably the Woman's College of Baltimore and Smith College at Northampton, Mass., have taken a step which most of their sister and brother institutions will do well to heed and possibly to follow. As a rule our American gymnasia, excepting those belonging to the Turnerbund and those organized in accordance with the principles of the Swedish system, fall short of excellence as schools of physical training. This, I take it, arises from the fact that the educational worth of physical training has been largely overshadowed in the minds of those who officer and control our schools and colleges by the obvious, but, in many respects, less important hygienic influences of muscular exercise. Whatever the reason for this state of things, the fact is obvious that our colleges and secondary schools, with few exceptions, have shown vastly more skill and energy in the acquisition of mere appliances than they have in developing the science and art of physical education. Indeed, one is tempted to think that those who control our colleges, and our preparatory and normal schools have yet to learn that physical education has a history and is capable of being organized as a genuine department of instruction.

Although the underlying principles of gymnastic exercises and athletic sports are identical, the distinctive aims and methods of the athletic trainer and the gymnastic teacher are divergent and to some extent antipathetic : and one reason, as it seems to me, for the lamentable neglect of genuine gymnastic instruction in the college world is found in the fact that college authorities have been so engrossed by a variety of unfamiliar and perplexing problems, forced upon them by the sudden and rapid expansion of the interest in athletic sports, that they have lacked energy for grappling further problems in bodily training. Quite naturally athletics constitute the most popular and obtrusive branch of physical training, and the athletic movement possesses much greater force and volume than any of the allied movements that have been revived or originated since 1860. Though the athlete belongs to a type that is not new to the world, he is practically a new species of man in America—a species having many varieties. The American gymnasium is a semi-original creation that has been devised mainly by the American architect in order to provide for the expressed or fancied needs of the American athlete. Allusion has already been made to the growth of athletic clubs within the past ten years. All things considered, the athletic clubs constitute the consummate and peculiar product of the athletic movement. There is nothing quite like them outside of America. Their influence, which is not salutary in all respects, is already great among schoolboys and collegians. The athletes as a class, those who aid them and those who bet on them, have had little to do with urging or promoting the educational side of physical training—for the simple reason that their interest in gymnastics is even feebler and less intelligent, considering their opportunities, than that of college faculties and boards of trust. It is chiefly in indirect or negative ways that the athletic clubs have contributed to the advancement of physical education, in its proper sense.

Athletics when wisely regulated afford valuable, I will even say invaluable, means of mental, moral, and physical training for boys and young men ; but the element of rivalry and competition is so inseparable from athletic aims and methods, and excellence in the athletic specialties demands so much time and requires such costly appliances, as to preclude the general adoption of athletic sports as the principal means of securing the hygienic and educational ends of physical training for the mass of pupils in our public schools, especially in urban districts.

Gymnastics, if well ordered and properly taught during the early years of school life, afford the best preparation that an aspirant for athletic honors can have. Aside from the question of expense, there is no good reason for prolonging mere gymnastic drill to the exclusion of the higher forms of gymnastics and of outdoor sports after a pupil reaches the age of fifteen years. When the managers of our high and preparatory schools shall have learned their business—as regards bodily training—they will, I believe, institute courses of gymnastic instruction after the analogy of their elementary courses in language and mathematics, so that their pupils, on entering college we will say, will be prepared to choose their athletic and gymnastic electives in much the same way as they now choose their elective studies when the opportunity is given them. When the schools perform their duty in the premises, the colleges can give up the kindergarten and grammar school styles of physical education, and it will then be much easier for them to solve the athletic question. That question will never be satisfactorily solved till it is taken out of the hands of growing boys and professional or semi-professional athletic trainers.

It is the part of wisdom to recognize the fact that athletics and gymnastics are co-ordinate departments rather than hostile camps, and to strive manfully to define their limits and determine their relations and interrelations ; inasmuch as one of the weightiest questions confronting us at this time is this : How shall athletics and gymnastics be justly united in the physical training of American youth of both sexes ?

Neither our colleges nor our athletic organizations have earned the right to speak with authority on the question of what constitutes a well ordered and practicable system of physical training for elementary and secondary schools. Therefore the successful introduction of school gymnastics, since 1884, by the cities of Chicago, Kansas City, Cleveland, Denver, Indianapolis, and Boston, through the action of their respective school boards, has been chiefly due to the zeal and insistence of the advocates of the German and Swedish systems of gymnastics who were prepared to speak with knowledge and to act with intelligence. In every city named above, excepting Boston, German free and light gymnastics have been adopted, and the directors of physical education are graduates of the *Seminar* or normal school of the N. A. Turnerbund.

The promotion of gymnastic teaching in the public schools has ever been one of the cherished aims of the Turnerbund; but its efforts in that direction met with but little recognition or success prior to 1884. During the last fifteen years the Turnerbund has built up a flourishing system of gymnastic schools for children of school age; and the experience gained in these schools—which should not be confused with the Turnvereine—has at last been turned to some account by the school authorities of several cities where the voting strength of the Germans is great. At first sight, it seems a most extraordinary circumstance that, up to 1885, American educationists and system-makers should have ignored, almost entirely, the practical and efficient system of gymnastic instruction in vogue among the German-American Turners. But the truth is, the Turners were somewhat chauvinistic and inaccessible, while the educational world, in spite of occasional gusts of theoretical enthusiasm, was really apathetic and incurious with regard to the practical side of physical education. Since 1884, at about which time the Turnerbund first made a course in English an obligatory part of its *Seminar* curriculum, the policy of the Turners has become more liberal and their influence and success correspondingly greater.

Unlike their Teutonic kindred, the Scandinavians of this country have made no general or effective propaganda for their national gymnastics. The rise of Swedish pedagogical gymnastics within the last five years has been due chiefly to American initiative and endeavor. The appointment in

1874 of a Swedish teacher for three months' service in the Girls' High School of Boston seems to have been a fortuitous circumstance. Nearly ten years ago Mr. Wilson, the superintendent of schools in Washington, D. C., organized teachers' classes in Swedish gymnastics under the charge of Mr. Hartvig Nissen, who in 1886-1887 gave instruction, with good success, in Swedish "Free-standing movements" in the Johns Hopkins University Gymnasium, of which I was then director. Owing to the lack of support by those in authority these experiments proved abortive.

The gymnasium of the Woman's College of Baltimore, which was opened in 1888-1889, and is in some respects without a rival in the country, was fitted with Swedish apparatus at the outset, and has always been managed in strict accordance with Swedish principles, the class-instruction being intrusted to graduates of the Royal Central Gymnastic Institute only. This was the first successful experiment to adopt Swedish methods on a large scale in the physical education of American youth. The gymnasium of the Bryn Mawr School for Girls, also in Baltimore, opened in 1890, likewise has a Swedish teacher for Swedish work.

But Boston has earned the right to be considered the most influential center, in America, of the movement for promoting Swedish educational gymnastics. This result, which has been brought about within the last three years, is primarily due to the wisdom, generosity, and public spirit of Mrs. Mary Hemenway, and secondarily to the adoption of the Ling gymnastics for the public schools by the Boston school board, in June, 1890.

The establishment, by Mrs. Hemenway, of the Boston Normal School of Gymnastics, which already stands in the forefront among similar schools in the country, is an event of capital importance in the history of physical training in America, and may well be ranked beside the gift, to Harvard University, of the Hemenway Gymnasium by Mr. Augustus Hemenway, her son.

Considered as a whole, the history of physical training, in America, has not been a brilliant one, and physical education is not only less advanced here than it is abroad, but it has not even kept pace with the progress made by most other departments of education at home. Progress in our cause has been materially impeded by the prepossessions and prejudices of the teaching class, which, like the general public, is still largely ruled by ancient and traditional conceptions of mind and body, and has so feeble a comprehension of the new physiology and the new psychology that it is unprepared to acknowledge the just claims of physical education. Progress there has been since 1825, but for the most part it has been sporadic, fitful, and retarded. Too often the experiments, in our field of endeavor, have been characterized by furor, hurry, and failure. He would be a bold man who should venture to predict, in the face of past events and present tendencies, that even the most hopeful experiments of the last ten years will not sink out of sight or lose their identity within the next decade. We are still prone to rash experiment and to uncritical imitation. It is in the comparatively rude and primitive field of athletics that our greatest triumphs have been won. Our originality has been chiefly shown in the improvement of buildings and the invention of apparatus. In the field of superior education, the interest of faculties and trustees in physical training is most usually manifested by costly offerings of buildings or other plant to the unappeasable "animal spirits" of their students and younger alumni. In the field of elementary education, though cheapness is a *sine qua non*, we have succeeded in initiating a number of tentative schemes, a few of which are decidedly promising. In the professional training of the teaching class, bodily training is commonly considered superfluous; and it is only here and there that public normal schools have taken any measures to provide for it. A large proportion of those who are rushing forward to fill the role of apostles and teachers of physical education are self-educated or insufficiently trained.

Since physical training, on its theoretical side, belongs to a class of questions that fascinate doctrinaires and dabblers, it has suffered much at the hands of its vociferous friends. It bodes but little good to the immediate future of our cause that a disproportionate number of those who offer themselves as recruits are women—with bees in their bonnets. Summer schools, Chautauqua methods, and crusades for compulsory legislation are ill calculated to correct this tendency. Agitation, discussion, imitative and uncertain experiment, have been the dominant factors in the growth of the American physical education movement hitherto. We cannot pass to the stage of constructive development, unless accurate knowledge, clear ideas, definite aims, thorough training, and the capacity for sustained effort shall become much more general within our ranks and among our allies than is yet the case.

But our prospect is not wholly dark. I am constrained to believe that there are gleams of promise in the sky. It is a significant and encouraging fact that the question of bodily training is like Banquo's ghost, and will not down. In one form or another it rises and shall rise before every generation of civilized men. For us and our successors it has assumed portentous proportions, by reason of the untoward influences of city life upon the rising generation. Never before have the teachings of medical science been so clear and authoritative as they are to-day regarding the necessity and the means of securing and conserving the health of the student class. Physiology and psychology have been revolutionized within sixty years, and the critics of our educational aims and methods are beginning to use the weapons thus furnished to their hands. The existing systems of physical education and "culture" are largely empirical in their nature; but the time is at hand when they shall be subjected to the scrutiny and tests of disinterested scientists and shall have judgment passed upon them by men who are able to distinguish between claims and proof, between shadow and substance. Our present fashion of lauding apparatus and of multiplying gymnasia, club houses, and grounds is, after all, somewhat of a blessing in disguise, as it tends to force the question as to the real purpose of such appliances and the best means of securing their proper use. That our educational authorities as a class shall continue much longer both deaf and blind to the plain teachings of science and experience as to the nature, scope, and legitimate results of physical education, seems improbable. To my mind, the most hopeful and distinctive characteristic of the present diversified and expanding interest in physical training is found in the growing conviction that trained intelligence must be employed to supplement and re-enforce enlightened enthusiasm, and in the evident desire of a few benefactors and governors of educational foundations to provide ways and means for developing and seconding such intelligence. In various quarters, including two of our leading universities, attempts are in progress to embody that conviction and to realize that desire. These attempts betoken the dawning of a new day. Let us gird ourselves and go forth to meet it!

REMARKS INTRODUCTORY TO PAPER BY M. GEORGES DEMENY.

President Hartwell: The first paper this morning is upon "The Influence of the Movements and Positions of the Upper Extremities upon the Expansion of the Chest," by Monsieur Georges Demeny, of the "Station Physiologique," of Paris, France. I think we are distinctly to be congratulated on having a paper contributed by a man of his standing. It is a fact of importance that abroad, just at this time, while we are interested in gymnastics and physical training, and are moving towards its organization on a sound, scientific, and pedagogical basis, that a still more advanced movement is going on among professional physiologists who can criticise gymnastics in terms of modern physiology, which is as different from the old physiology as slang is from Addisonian English. They are taking up this subject, and after having devoted their lives to physiological studies, are now studying gymnastics from a scientific, physiologic point of view. This is worth more to our cause than twenty gymnasia or a million dollars spent in them, or ten new normal schools. Such men are Monsieur Demeny and Professor Mosso of Turin, who are at work upon this problem in a modern, scientific way. When we hear what they have to say we may have to reconstruct many of our theories. Professor Mosso, one of the leading physiologists of Europe, is now engaged upon a work upon the Physiology of Exercise, which every student knows is a book that we ought to have, but have not had yet. He also has in course of preparation a work on Exercises for Women. Now, when two such men as these undertake to study the progress of this work we may well congratulate ourselves on the fact and abide the results.

The paper by M. Demeny was then read, in translation, by Dr. Luther Gulick of Springfield, Mass.

THE INFLUENCE OF METHODICAL GYMNASTICS IN INCREASING CHEST CAPACITY.

BY M. GEORGES DEMENY.

Several works on physical exercise have been recently published in France, which, in pleasant guise, conceal errors that cannot escape a careful observer. It would seem as if certain authors had placed their talents at the service of a theory; had sought to magnify their own ideas rather than to enlighten the public as to the real value of physical exercise. There are even publications which would carry us backward should we put our faith in them. They uphold unmethodical exercise and cleverly make it appear that the results of methodic gymnastics are injurious. They confound poorly taught gymnastics—and poor in every respect—with carefully thought-out systems that have long had the sanction of experience. This criticism professes to rest on scientific grounds, and by a sophistry, which however is easily discerned, would fain prove that the spontaneous modifications which are inevitably and unconsciously produced in one who takes exercise in a haphazard way cannot be secured more certainly and more quickly by methodic training. This is to deny method in education in general.

The arguments employed to this end are of two kinds, sentimental and physiological. The sentimental arguments are those by which one ventures to decide as to the value of an exercise according as it is "natural" or "artificial." To refute this assumption it is sufficient to ask those who make it. to define exactly what they mean by "natural" and "artificial." On that theory they must also refuse the aid of art in all social activity. To be logical they should give up clothing, dwellings, domestic economy, art, science, medicine, methods of intellectual education, under the pretext that none of them are natural. We must ask them if it is "natural" to play cricket, to ride horseback, to ride on a velocipede, to skate, to coast, to fence.

Man by nature is not necessarily a model of health and strength. It is only by great care that he survives infancy, and he makes progress only under conditions that are favorable to his development. Those who are not placed in a suitable environment disappear, and owing to this selection one is inclined to think that all children are equally vigorous. With our modern social state the conditions of life have changed. We carefully tend those who are born weak, and it becomes our duty to make them strong and to help their physical development by all proper means. What do we care whether those means be natural or artificial, provided they are good ?

Outdoor games and sports, in the fresh air, are undoubtedly excellent, especially for children, and we should be grateful to those who try to find practical ways by which city children of the working classes may have the advantages of country life. But what are we to do when the weather is bad and there is no shelter ? What are we to do when room and time both fail? Must we give up that daily exercise which is recognized as a necessity? No, we must find some way of exercising a large number of pupils in an orderly fashion under one teacher in a small space and in a short time.

The advantage then of systematic exercises is evident, that is, a system of exercises so chosen and classified that each pupil shall have a sufficient amount of exercise. The value of the lesson should be measured by the intensity of the good effects that it secures in the physical development of the youth.

The objection that we should consider only the pleasure of the child does not hold in matters of education. It does not belong to the child to prescribe the duties of the master. If we were to grant this in other directions we should begin by doing away with all schools and all methodic preparation for the work of life which requires more or less weary apprenticeship. The truth is, that physical education, like education in every direction, should be based on facts obtained by study and knowledge of the child ; on the knowledge of the relations existing between the functions of life and their organs, as well as on a study of those agents which may well be employed to improve those organs and the resulting functions.

One of the most important functions of life is respiration, and we all know how great an influence bodily exercise has upon that function. We all agree in the advantage of a well-developed chest, but if one would indicate exactly in what that development consists, how exercise may help to secure it, he finds himself face to face with two theories, one might almost say two schools.

I will not stop to refer to the mistake of those who confound the increase of the circumference of the thorax with the real dimensions of the thoracic cavity. The muscles and fat which overlie the walls of the thorax may vary sufficiently to hide its real dimensions. It is the size of the thoracic cavity which chiefly interests us, and especially the movements of the thoracic walls during respiration. It is necessary to know this, for its extent measures the capacity for breathing and determines the amount of air that comes in contact with the capillary surface (*nappe sanguine*) in the lungs, by which the gaseous interchange which constitutes the respiratory function is brought about. The enlargement of the thoracic space and above all the enlargement of the thoracic movements cause a more perfect hæmatosis and a freer circulation in the heart, the lungs, and the large vessels of the chest. The most efficacious way to secure this is through correct posture and arm exercises, especially those employed in Swedish gymnastics which tend to keep the vertebral column erect.

This opinion however is not accepted by the opponents of pedagogical gymnastics. The arguments which they employ may be summed up as follows :—

1. The lungs, like other organs, are developed by exercise.

2. The exercises that most develop the lungs are those that give them the most work to do by increasing the respiratory function ; that is, exercises which put one out of breath ; which put in play the muscles of the lower extremities and call for a great expenditure of muscular energy.

3. Running is a type of the exercises that put one out of breath, it is therefore the ideal of respiratory exercises and it is to this alone that we need have recourse to expand the lungs and the chest.

This mode of reasoning may satisfy those who have never taken violent exercise, but those who have practiced running know that if it increases the respiratory function it also overtasks the heart to such an extent that it is not safe to recommend it for young children. Professional runners contract affections of the heart, and no trainer who knows his business would allow a young horse to be forced into a quick gait and let it be kept up for any time.

The phenomenon of getting out of breath is due not only to the presence of carbonic acid in the blood, it is accompanied by difficulty in the pulmonary circulation. The latter is checked, and the right side of the heart, being choked with venous blood, meets with unaccustomed resistance. It throws out less blood than it receives and it dilates as at the end of an effort of expiration. Moreover the man who is out of breath makes great efforts at inspiration and by that very effort draws blood into the lungs and heart. Expiration is difficult, breathing is short, and consequently circulation is impeded.

Running, therefore, though it may excite the respiratory function, should be exercised with prudence or it will overtax the heart.

But though running may have some effect upon thoracic dilatation it is not the only way to affect the organs of respiration. There are exercises which do the same thing without producing this violent action of the heart. What is the effect of running ? It causes intense muscular action. It speedily encumbers the circulation with toxic matter—the products of respiration—which passes into the tissues. The presence of these products, consisting in great part of carbonic acid, excites the nerve centers which govern respiratory action. If the lungs expand it is because the thorax expands. The lungs only follow the thoracic walls, to which they adapt themselves by reason of the atmospheric pressure within. Far from exerting a pressure against the interior walls of the thorax, the lungs exert suction upon them. If the thorax remains dilated it is only because the ribs and diaphragm offer resistance to their elasticity. Inspiration is produced by external muscular action. Expiration, on the contrary, is usually due to a cessation of the inspiratory movements and to contraction of the lungs through their own elasticity.

The danger from penetrating wounds of the chest is due to the fact that when the thoracic cavity is perforated the air rushes into the pleural vacuum and there is no longer any contact between the thoracic surface and the lungs. The latter, no longer controlled by atmospheric pressure within, yield to the force of their own elastic tissue, assume a globular form, and rush toward the upper part of the thorax. For the same reason lungs taken from an animal's chest lose the form they had during life and must be inflated to show that form. If it be necessary to drain the pleural cavity in a person suffering from an accumulation of serous liquid there, it is not sufficient to remove the liquid alone by making an opening into the thorax, but there must also be insufflation by means of an air-pump.

The lungs, then, simply adapt themselves constantly to the thoracic walls ; they *press* against them only when with closed glottis there is an attempt at expiration.

The modifications produced in a person who is increasing his breathing capacity do not necessarily result in an increase of the absolute dimensions of the thorax but in a greater amplitude of movement of the thoracic walls.

I may refer here to the results of some experiments made at the Military School of Gymnastics at Joinville-le-Pont, by Messrs. Marey and Hillairet, by M. Roblot, M. Villeman, and by myself. The pupils measured both before and after six months' training all show greater amplitude of respiratory movements. This result has been clearly demonstrated by the thoracometer, the thoracic compass, and the pneumograph.

It is easy to show that the breathing capacity of a person always increases in direct proportion to the movements of the thorax. The amount of air expired corresponds to the movements of the walls. Those who have large breathing capacity have also large amplitude in the movements of the ribs. When one wishes to inhale as much air as possible it is accomplished by raising the ribs as much as possible. This is readily seen when a person is suffocated or is out of breath. The part the diaphragm plays is limited ; there may be deep inspirations while the abdomen is motionless, or it may even be hollowed in by the suction of the abdominal viscera.

The figure in "Nouveaux Instruments d'Anthropometrie," page 10, shows the form of the thoracic and abdominal movements during deep inspiration.

Singers in the Paris opera whose respiratory apparatus I have examined, do not move the abdomen while singing but have decided thoracic breathing. The movements of the thorax, then, are very important in the matter of respiration.

We shall now see that exercises of the arms and stretching the trunk increase the movement of the ribs and thus help to increase the capacity for breathing.

Motions of the arms are usually produced by muscles inserted in the trunk and finding there their fixed point of attachment.

But inversely by gymnastic art one can change these fixed points, so that if the arms are stretched upward and held firmly there the motor muscles of the arms shall act in such a way as to expand the thoracic walls. The stretching of the vertebral column spreads apart the fan-shaped cage formed by the annular shape of the ribs, while at the same time raising their anterior extremities.

It is unnecessary here to enter into any anatomical argument and I shall only cite certain cases where exercises of the arms and stretching act undeniably in enlarging the chest capacity and are even accompanied by the entrance of air into the lungs.

Every one knows the methods which are resorted to for the restoration of persons who have been asphyxiated. By raising the arms air can find entrance into the lungs. If you suspend yourself from a horizontal bar with your arms stretched at full length, the body hanging motionless and limp, the hands well apart, you can convince yourself that it is impossible to expire all the air you have in your chest ; it is too much expanded. Sections of the thorax taken at the same level during inspiration and after forced expiration, and then taken again while suspended by the hands during inspiration and after expiration, show the expansion of the thorax during the suspension.

The same expanding action of the thorax is produced by raising the arms, throwing back the shoulders, and straightening out the vertebral column. A man who has been sitting long at his desk writing, feels the need of raising his arms, stretching, and taking a long, full breath. The exercises of Swedish gymnastics are eminently adapted to meeting this want without overtaxing the heart. (See "L'Education Physique in Suède.")

Conversely all gymnastic exercises which require the crossing of the arms are detrimental so far as the dilatation of the thorax is concerned, because they increase the curvatures of the vertebral column, and lower the ribs. It is impossible to inhale a large amount of air if one stoops or if one wears corsets or too tight clothing.

We can then by arm exercises increase the amplitude of the movements of the thorax by giving mobility to the articulations of the ribs and by thus preparing a condition favorable to full respiration and for securing the best breathing capacity. That is nature's way to help those who need large capacity for breathing, and we can aid her in securing this result more quickly by preparing the respiratory organs for further perfection.

The objection that breathing capacity increases only in those who do a large amount of muscular work is easily met. Singers have always a large breathing capacity. They are specially educated to inhale large quantities of air and to be economical as to the amount of air spent during the emission of the voice. This is because the respiratory movements are under the control of the will. Whether it be the unconscious reflex action due to suffocation, or whether it be the voluntary conscious action, the thoracic walls expand by the same mechanism and the result is the same. It is easier and less dangerous to obtain this result by learning to breathe without being compelled to pant for breath, for the latter action is always accompanied by irregular circulation or difficulties in the circulation.

We have at last proved that the deaf and dumb who have never practiced the emission of sounds have a flattened conformation of the thorax and that this form changes as the result of the phonetic training which they receive in special schools, the object of which is to teach them to speak.

There is no doubt that those who will exercise their respiratory organs by mechanical expansion of the thorax by means of arm exercises, stretching the trunk, and suspending the body, will make real improvement. If by the action of the will they accustom themselves to breathe slowly and amply they will find themselves prepared in advance for the time when they shall need a full supply of air in their lungs. They will less easily get out of breath, because they will have already brought about in part the necessary modifications which ought to be produced spontaneously.

In conclusion : The education of the organs of respiration is a necessary part of physical education. It is secured by arm exercises, stretching of the trunk, suspension at full length from the hands, and by breathing exercises. That is the way to help nature to obtain more quickly the results at which one must aim if he is often to yield to violent exercise, which is not always without danger.

(Signed) G. DEMENY.

PARIS, March, 1892.

INDIRECT EFFECTS OF PHYSICAL EXERCISE.

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In selecting as my theme to-day the *indirect* effects of physical exercise, I intend to speak of several classes of results that follow from indiscriminate use of gymnastics—results that are injurious rather than beneficial. But I must not be understood as wishing by this enumeration of evils to abate in the slightest degree the proper enthusiasm for physical exercise as a good thing. The direct effects are good. Certain ones of the indirect effects are bad. This does not discredit the good but it cautions us to discover the limits, the boundaries, within which exercise is safe. It causes us to realize the importance of *measure* in all that relates to life or the vital forces. *Measure* or temperance, in the sense of reasonable self-restraint, was the chief idea that the Greeks discovered as the guide for their education. And the Greek education was the only education which has ever existed that made physical culture an end instead of a means.

There must be measure or temperance in eating and drinking; temperance in work, temperance in rest, temperance in play or recreation; temperance in mental labor, temperance in physical labor. There must be proportion and harmony in these matters because each function of our bodies is in some way dependent on the other functions and limited through them. The exercise of one function affects other functions and is in turn affected by them. The true balance or harmony sought is the state of healthful action wherein the functions of the lower activities are such as to afford a maximum of assistance to the higher activities. The body should assist the mind. It should afford nervous energy in the largest amount and in the form of a most enduring supply for man's spiritual needs.

It is of course well known that physical exercise affects directly the muscular system and that the muscular system is not all of the body, nor indeed itself directly the generator of what I have called nervous energy. There is a nutritive process of digestion, and a distributive process of circulation through the heart and lungs and liver; the two forming a building-up function which restores and repairs and increases the organism and removes the waste. There is besides a nervous organism which receives impressions from without and conveys impulses that react on the environment.

Physical training as we understand it deals directly and chiefly with the muscular system and with that part of the nervous system which conveys impulses from the brain outward through the limbs to the environment. Physical exercise indirectly acts on the digestion and circulatory system and on the nerves of sensation; and its relation to those other bodily functions is nearly or quite as important as the direct relation of exercise to the muscles and the acquirement of strength.

During the first fifty years of agitation on the subject of bodily training, connected with the rise of Turner societies in Germany and the preaching of the gospel of bodily culture as auxiliary to intellect and will by Spurzheim and his disciple George Combe and their numerous followers, we may say without hesitation that the doctrine of physical exercise was passing through its stage of superstition and quackery. There was a sharp dividing line between the believers in hygiene and the old school of physicians, and this separation led quite naturally to dismal results. The doctors opposed with blind conservatism the new apostles, and the latter justified the attitude of the former by a radicalism equally blind and fanatical.

It is the glory of the present revival of physical exercise that it is led by educated physicians. It is a new movement of the highest importance.the establishment of a resident physician in each of our colleges as supervisor of gymnastics and recording inspector of physical development among the students. It means a synthesis of science with reform and the end of the era of quackery in hygiene.

But it is not something that can be matured all at once. There is a fringe of the old fanaticism which still attaches to the new movement, and as a consequence an unreasonable conservatism which is the consequence of a reaction against obvious quackery. The regular medical directors of physical exercise are reducing their observations to a statistical form and are reversing many of the principles supposed to be fixed in former times.

They are dispelling many old illusions. They are widening the survey of effects direct and indirect. Already we are beginning to have a harvest of treatises large and small which record the more scientific observations.

The old athletism in a college produced a small quota of splendidly trained bodies. The majority of the students made but little progress. Their exercise consisted for the most part in sitting on the damp ground or on a dry fence and seeing the picked men of their classes engage in the violent contests for mastery.

Athletics was rather a system of eliminating the weak and of selecting the already strong for the contests at ball or boating. Even in the gymnasium it was the strong who held out and continued to practice the exercises.

But a system that selected the already strong rather than transformed the weak into the strong was only a sham for physical education. That sham is now in process of removal by the substitution of special courses of exercise provided by the medical gymnasiarch for each individual after special diagnosis.

The athlete theory of gymnastics was a sort of survival of the old Greek and Roman customs. It was not realized that the Greeks and Romans attached not so much a hygienic value to athletics as a religious significance. The Greeks celebrated their worship of physical beauty, the gods of Olympus, by their games, and the Romans equally celebrated not beauty but self-sacrifice by their sports in the arena. The Greek conceived the divine as a godlike control of the body by the mind in such a form as to produce gracefulness of carriage. The Roman worshiped the political state as the incarnation of the divine and celebrated it by spectacles of self-sacrifice wherein human gladiators contended in the death struggle with each other or with wild beasts. This symbolized for him the struggle within each citizen who sacrificed his life or property for the safety or advancement of Rome.

Careless readers of history may suppose that all nations have cultivated bodily perfection in the same way as the Greeks and Romans and for the same ends. But it is not so. The savage tribes seek skill in war by physical training, while we seek to increase the healthful generation of nervous energy. But many Asiatic nations have for religious reasons opposed physical culture as something leading to evil—as for example the Hindoos and the Buddhists.

The Hindoo worshiped an abstract unity devoid of all form, which he called Brahma. His idea of the divine is defined as the negation not only of everything in nature, but also everything human. Nothing that has form, or shape, or properties, or qualities—nothing, in short, that can be distinguished from anything else, can be divine according to the thought of the Hindoo. This is pantheism. It worships a negative might which destroys everything. If it admits that the world of finite things arises from Brahma as creator, it hastens to tell us that the creation is only a dream, and that all creatures will vanish when the dream fades. There can be no hope for any individuality, according to this belief. Any art that grows up under such a religion will manifest only the nothingness of individuality, and the impossibility of its salvation. Instead of beauty as the attribute of divinity, the Hindoo studied to mortify the flesh ; to shrivel up the body ; to paralyze rather than develop his muscles. Instead of gymnastic festivals he resorted to the severest penances, such as holding his arm over his head until it wasted away. If he could produce numbness in his body so that all feeling disappeared, he attained holiness. His divine was not divine-human, but inhuman, rather.

But opposed to this oriental idea, the Greek religion made beauty the essential feature of the idea of the divine, and hence his art is created as an act of worship of the beautiful. It represents the supreme attainment of the world in pure beauty, because it is pure beauty and nothing beyond. Christianity reaches beyond beauty to holiness. Other heathen religions fall short of the Greek idea and lack an essential element which the Greek religion possessed. The Greeks believed that the divine is at the same time human; and human not in the sense that the essence of man, his purified intellect and will, is divine, but human in the corporeal sense as well. The gods of Olympus possess appetites and passions like men; they have bodies, and live in a special place. They form a society, or large patriarchal family. The manifestation of the divine is celestial beauty. Moreover the human being may by becoming beautiful become divine. Hence the Greek religion centers about gymnastic games. These are the Olympian, the Isthmian, the Nemean, and the Pythian games. Exercises that shall give the soul sovereignty over the body and develop it into beauty are religious in this sense. Every village has its games for physical development; these are attended by the people, who become in time judges of perfection in human form, just as a community that attends frequent horse races produces men that know critically the good points of a horse. It is known who is the best man at wrestling, boxing, throwing the discus, the spear, or javelin; at running, at leaping, or at the chariot or horseback races. Then at less frequent intervals there is the best contest at games between neighboring villages. The successful hero carries off the crown of wild olive branches. Nearly every year there is a great national assembly of Greeks, and a contest open to all. The Olympian festival at Olympia, and the Isthmian festival near Corinth, are held the same summer; then at Argolis, in the winter of the second year afterwards, is the

Nemean festival; the Pythian festival near Delphi, and a second Isthmian festival, occur in the spring of the third year; and again there is a second Nemean festival in the summer of the fourth year of the Olympiad. The entire people, composed of independent states, united by ties of religion, assemble to celebrate this faith in the beautiful, and honor their successful youths. The results carried the national taste for the beautiful as seen in the human body to the highest degree.

The next step after the development of the personal work of art in the shape of beautiful youth, by means of the national games and the cultivation of the taste of the entire people through the spectacle of these games, is the art of sculpture, by which these forms of beauty, realized in the athletes and existing in the minds of the people as ideals of correct taste, shall be fixed in stone and set up in the temples for worship. Thus Greek art was born. The statues at first were of gods and demi-gods exclusively. Those which have come down to us cause our unbounded astonishment at this perfection of form. It is not their resemblance to living bodies, not their anatomical exactness, that interests us, not their so-called "truth to nature," but their gracefulness and serenity—their "classic repose." Whether the statues represent gods and heroes in action or in sitting and reclining postures, there is this "repose" which means indwelling vital activity and not mere rest as opposed to movement. In the greatest activity there is considerate purpose and perfect self-control manifested. The repose is of the soul, and not a physical repose. Even sitting and reclining figures—for example, the Theseus from the Parthenon, the torso of the Belvedere—are filled with activity, so that the repose is one of voluntary self-restraint and not the repose of the absence of vital energy. They are gracefulness itself.

What a surprising thought is this, of a religion founded on beauty! How could it have arisen in the history of the world? It was above the Hindoo and Buddhist civilization, and below the Hebrew civilization which taught that righteousness and goodness were the supreme attributes of God and the supreme objects of attainment by man.

Modern civilization has adopted from the Hebrew

"Chosen People" the idea of holiness; from the Greek the idea of beauty; from the Roman the idea of a social whole as state and nation and as corporation municipal, and as free association, and it unites these ideas and subordinates each to a higher ideal. Even the Hebrew idea of holiness is subordinated to the Christian ideal of the service of humanity.

We do not approve the sacrifice of the higher interests of the soul for the beauty of the body; nor for the needs of military service; nor for the theatrical display of strength and brutal conquest. We regard physical exercise as desirable for the increase of nervous energy to be expended for rational, spiritual purposes.

Our civilization is so bent on the conquest of nature and the production of wealth, that it perpetually strains its supply of nervous energy and produces disaster along this line. Here is the special problem of our time for hygiene to meet—how to restore and conserve nervous energy.

There are three factors here—first, the one of food and its proper assimilation; second, the factor of rest and sleep; third, the factor of exercise, muscular and mental. It is obvious enough that digestion requires nervous energy just as muscular and mental labor does. Hence digestion must be given time. It must not be encroached on by bodily exercise or by mental exercise. But what is the average amount of time required for this, and should it be total cessation from bodily and mental labor, or is light labor of both or either best for the digestive process ?

Here our quantitative tables and the observations of our medical directors are to give us the true answer — not abstract general answer like those old dogmatic answers, but definite answers qualified to suit different temperaments, and abounding with tests easily applied by each individual.

It is necessary to have the directions so specific that the inexperienced youth will not err in their application. This is an age of self-educated men. The printed page is the means of such education. It is an age of departure from traditional standards. It is all the more necessary to surround new departures with safeguards.

If the chapters could be written which describe the grave mistakes committed by amateurs in the use of physical exercise as a hygienic measure, they would furnish a sufficient warning for the present generation. They would describe various experiments at using midnight hours for walks and rides in the open air. The student used all his day for intellectual work, and supposed that an hour or two of exercise taken at a late hour of the night would answer his needs. Another experiment selected its period of exercise in the early morning, curtailing the period of sleep in order to secure the requisite time before breakfast. Violent physical exercise taken early in the morning is very exhaustive of nervous energy, and it is probable in most instances that the student has cultivated nervous dyspepsia quite as much as he has cultivated his muscles. We have all read in the biography and autobiography of Thomas Carlyle the mention of his walks late in the night. Every one has had something of this kind in his own experience, or in the experience of persons of his acquaintance. It was only yesterday that a distinguished laborer in the cause of education told me of his own follies in this matter, led on by reading injudicious writings on this subject of hygiene. He had so curtailed his night's rest for the sake of morning exercise, that there resulted a nervous collapse. His physician prescribed as the only possible remedy a long period of total rest. The hours of sleep at night were nearly doubled, and a relaxation from study in the daytime was insisted upon. Relief came as a consequence.

Besides this mistake of cutting off the sleeping hours at the beginning or at the end for the sake of physical exercise, there is an equally harmful mistake of bringing the hour of exercise close to the hours for meals. Just preceding or just succeeding a meal any exercise of sufficiently energetic a character to cause the blood to leave the organs of digestion and fill the muscles of the body or the brain is injurious and tends to produce dyspepsia. The stomach needs the greater share of the nervous energy, and likewise of the arterial circulation. Dr. Sargent, in the paper to which I have alluded, thinks that violent exercise should not be taken at a period so long as three hours after a meal on account of the danger of faintness which neutralizes the good results of such exercise. Provided the person has just taken violent exercise the blood is diverted to the muscles and brain and away from the stomach. The taking of food at this time when the nervous system is depleted of its vitality is considered unfavorable to the best action of the digestive functions.

We remember, too, that cold bathing, which has been so often commended with a great lack of discrimination, is another source of injury to the health when it is resorted to by persons with nervous temperaments or feeble constitutions, and at a time when the system has been depleted of its vital energy by work or exercise, or when the digestive organs are occupied with recently taken food.

The old rule made by a farmer population to encourage early rising, which mentions as its effect health, wealth, and wisdom as its product, has made mischief with conscientious students who have supposed that early rising in itself is a good thing even when not preceded by the precaution named in the adage, namely, "early to bed." It is a very important matter to consider that physical exercise has its best effect when it is carried on socially in the form of plays and games, in the form of contests with one's fellows. The stimulus which is derived from emulation and interest in one's fellow students has to be compensated by a sheer exertion of the will in the case of calisthenic exercises and in the case of prescribed athletic training by the use of weights, ladders, and the other machines of the gymnasium.

The object of gymnastic training, it has been said often enough, is to put the will into the muscles. It is to give one such control over all his muscles that each act performed by the body is performed by the use of all the muscles which nature has provided for the purpose. The farmer or the blacksmith develops a few muscles and neglects others. The gymnasium is supposed to cultivate many muscles which remain rudimentary in the original man, and here I think is an item of compensation which makes up for a great deal of the deleterious results coming to the imprudent gymnast who is careless about the hygienic precautions just now mentioned in relation to eating and sleeping. The gymnast, and I mean by the gymnast one who has taken sufficiently violent exercise to develop to a considerable degree the muscles of the chest, back, arms, and the other limbs—the gymnast, I say, has acquired the power of putting his will into the muscles of his body by a slight effort. The gymnast performs all slight bodily actions such as rising from a chair, sitting down, walking, climbing stairs, swinging his arms, turning his head, everything in short that he does with his body, by using many more muscles than the untrained gymnast uses. Hence it happens that one who has taken gymnastic exercise retains till old age the power of getting a maximum of exercise out of a minimum of bodily movement. Walking a few rods and running up and down stairs two or three times a day gives him as much exercise as the average farmer gets from two hours of farm work.

It is most important to note that this gymnastic training and calisthenic training, so called, are violent demands upon the will power and a rapid drain of the nervous energy. Hence physical exercise directly after a hard lesson is not a proper sequence. The will power, which has been drained by the mental work, is reduced to complete exhaustion by the violent physical exercise.

"Every pound of energy expended on work either of mind or body," says Dr. Sargent, "must be made good by food, rest, or sleep." Severe mental work cannot be compensated by severe physical work. It is the rest of the will which is required, and the will is rested not by a new tension of its exercise, but by a state of collapse such as comes when caprice and arbitrariness and the yielding to one's humor succeeds the tension of work. Plato's description of the Greek athletes, stupid and lazy fellows who did nothing but eat and sleep, describes the condition of rest after severe physical exercise, and still more the true condition of rest of the intellectual athlete after severe mental exercise.

These are the indirect things which I wish to commend to your consideration as results of injudicious physical exercise. The direct effects only are those which are usually described in works of hygiene and physical training. I quote an enumeration of them here from Dr. Lankaster, to show how simple the whole matter looks when the precautions are omitted. Nearly all things seem simple when taken out of their relation to their environment.

He says: "The employment of the muscles in exercise not only benefits their especial structure, but it acts on the whole system. When the muscles are put in action, the capillary blood-vessels with which they are supplied become more rapidly charged with blood, and active changes take place, not only in the muscles, but in all the surrounding tissues. The heart is required to supply more blood, and accordingly beats more rapidly in order to meet the demand. A larger quantity of blood is sent through the lungs, and larger supplies of oxygen are taken in and carried to the various tissues. The oxygen, by combining with the carbon of the blood and the tissues, engenders a larger quantity of heat, which produces an action on the skin, in order that the superfluous warmth may be disposed of. The skin is thus exercised, as it were, and the sudoriparous and sebaceous glands are set at work. The lungs and skin are brought into operation, and the lungs throw off large quantities of water, containing in solution matters which, if retained, would produce disease in the body. Wherever the blood is sent, changes of a healthful character occur. The brain and the rest of the nervous system are invigorated, the stomach has its powers of digestion improved, and the liver, pancreas, and other organs perform their functions with more vigor. By want of exercise, the constituents of the food which pass into the blood are not oxidized, and products which produce disease are engendered. The introduction of fresh supplies of oxygen induced by exercise oxidizes these products, and renders them harmless; all other things being the same, it may be laid down as a rule that those who take the most exercise in the open air will live longest."

But the student who reads of these direct effects without at the same time carefully learning the indirect effects of digestion and sleep and mental work or worry will almost inevitably neutralize all the good that comes from physical exercise.

The teacher, who, full of faith in calisthenic exercise, thinks to do away with the old-fashioned recess and to gain a positive benefit by physical training will fall into frightful errors.

Let us consider for a moment the conditions of the problem.

Within the school the pupil is supposed to be under a severe strain of discipline and attention to study. Regularity, punctuality, silence, conformity to rules as to sitting or standing—strict self-control on the part of the pupil, and a forced attention to his lesson or the recitation of his fellow pupils or the explanations of the teacher—all this produces a great tension of physical and mental powers. If it were continued too long, congestion would be produced, affecting the heart or brain or the digestive functions or some local nerve center. Past experience noting this fact has endeavored to avoid the danger by establishing the recess. The pupils are all dismissed from the school building and removed from the school restraints for an interval of a few minutes. The pupil leaves the close air of the schoolroom and rushes out into the pure air suddenly relieved from the cramp of muscles in sitting in a particular position on a hard seat and relieved likewise from the cramp of nervous energy that has been diverted from natural functions of digestion, circulation, and secretion, and concentrated on the conscious processes of attention and obedience to the external commands of the teacher or to his own self-imposed industry.

The chief use of the recess is its complete suspension of the tension of the will power and the surrender to caprice for a brief interval. Any form of calisthenics or gymnastic exercises is, therefore, a diversion of the recess from its normal function. It is the substitution of one kind of tension of the will for another.

The tension of the will requisite to perform properly the requirements of school discipline and instruction is such as to withdraw the nervous energy from those great centers of secretion and circulation of the stomach, the heart, the kidneys, the liver, the lungs. Congestion, as before said, is easily initiated, and, if continued, will produce functional derangements connected with the organs of digestion and circulation. The seeds of indigestion, renal weakness, liver complaint, constipation, even of fearful scourges like Bright's disease, may be sown in the system in early years by injudicious confinement in the schoolroom.

The great physical need of the pupil is relaxation; the pupil needs to stretch his cramped muscles and send the blood in torrents through his limbs, which become torpid with unuse while he has been sitting or standing for the school exercises. The pupil is in want of fresh air, and of the deep inflation of the lungs that exercise in the open air gives. He ought to use his voice too. The performers propose to substitute calisthenics for the purpose of supplying all these wants. They will throw open the windows and let in fresh air; they will have a system of well-devised movements which will give the needed circulation of the blood, etc.

Calisthenic exercise serves a good place in the schoolroom, but its most important function is not a physiological one. It is true that the blood is caused to circulate more vigorously through the limbs and those parts of the body that have become partly torpid with sitting or standing still. But the chief demand upon the pupil in the calisthenic exercise is a requirement of him to strain his attention and exercise his will. It is a will-training to a greater extent than a physiological training. The great distinction between work and play is this one: in play the mind is spontaneous, governed entirely by its own individuality; in work the will-power is exercised to conform its individuality to some externally prescribed course of action. Calisthenic exercise is severe work, and not by any means a relaxation. But the child needs relaxation, and not merely a change of work, although the change is of some benefit. The exercise of the limbs, in accordance with a prescribed formula, is not the thing that nature requires.

What has the child been doing? Consider it again: He has been exercising his will in the four directions of self-control; to be regular, punctual, silent, and industrious, now giving his attention to the mastery of some subject by himself, and anon following with alertness and critical acumen the recitation of some fellow pupil, or some explanation or direction by the teacher. Calisthenics does not afford relief to the will-power. We have seen that all exercise of the will in the act of fixed and unremitting attention has a powerful influence over the digestive, circulatory, and secretory functions of the body. This influence, if not intermitted, will cause derangement of each and all these. A run in the open air, a saunter at will, or a vigorous game with one's fellows, free from restraint or authority—any exercise, in short, of the spontaneous choice of the pupil, will give this desirable relief to the heart, the stomach, the glands, and ganglia.

Our medical advisers who supervise gymnastic exercises are in process of correcting the evils and extending the benefits of physical education.

Their best service is to be along the line of enlightening the student who is on the verge or beyond the verge of nervous prostration, how to build anew his nerves. For they will teach him the function of sleep and amusement, of rest before and after meals, of the danger of following a mental strain of the will by another strain of the will directed to the muscles; of the danger of exercise late at night; of the danger of tobacco and alcoholic liquors.

We shall have science instead of quackery. And in the anticipation of the arrival of all these good things allow me to congratulate you on being the pioneers of the better, the new physical education.

THE INFLUENCE OF BODILY EXERCISES UPON LENGTH OF LIFE.

BY J. MADISON TAYLOR, M.D., A.M., PRINCETON, OF PHILADELPHIA.

It is not possible to estimate statistically just how much length of days is enhanced by physical exercises, but it is feasible to establish two propositions: (1) That judicious activities of the body tend to maintain and increase its efficiency, and (2) That the hurtful effects of violent athletic competitions are popularly overrated.

It would be most agreeable to me to consider the first of these, and, drawing from history and experience, illustrate amply what few will be disposed to deny. Concerning the second there may be differences of opinion, and here it is well to apply the test of carefully marshaled facts and suffer inferences to evolve themselves. I hope to escape the role of advocate, but propose reviewing such meager data as I have been able as yet to collect and deduce therefrom only warrantable conclusions. My study so far is most imperfect, but my hope is to elicit discussion and comment so that the truth may come ultimately forth. Within the coming year I shall hope for much light and added knowledge. I have reason to expect large additions to the data yet collected, and these may have a value of which you shall judge.*

Against the growing interest in athletic matters there are constantly urged objections to the effect that many perfectly healthy young men are injured beyond repair by strains and shocks to vital organs had in the course of training or competitive sports. Even among those who avow much confidence in the value of physical exercise, yet many declare the pity of it, because such havoc is wrought thereby. Instances are cited, rather vaguely 'tis true, of fine fellows utterly wrecked by contests on land or water, lives cut short by overtasks at so-called sports.

If these accusations are soundly based, let us then who should understand the kinds and degrees of their perils be quick and persistent to sound warning notes. We of the medical profession are endowed with the grave responsibility of defining and pointing out dangers and urgently insisting on their avoidance here and elsewhere. In this direction lies our greatest privilege and duty. Insidious evils lie about our feet perpetually, toxines lurk in our very food and air and water. Mayhap certain of these are only relatively hurtful, but, at least, it behooves us to teach youth how to avoid disease and attain to vigorous age ; and one of the most valuable measures is to train the body to grow in best proportions. During this process of training the thrilling joy of sports and competitions naturally comes in to hurry and overcolor our judgment. The special inquiry as to what hurts may follow in the wake of these is only secondary to the first need of direction how best to train.

*** Dr. Taylor will be most grateful for any information on this subject.**

As showing how far even the best and wisest of medical teachers can err in opinion, let me cite as typical of what many say, the assertion of Dr. Benjamin Ward Richardson, than whom few men stand higher, and deservedly, in the estimation of medical thinkers.

"I can scarcely overrate the dangers of these fierce competitive exercises which the world in general seems determined to applaud. The state of perfection arrived at is at best artificial and sustainable but for a brief period. The mode of life for perfection is itself incompatible beyond a limited time with the ordinary requirements and necessities of life. And when the artificial system of training ceases, the involuntary muscles, the heart especially, remain in strength out of all due proportion greater than the rest of the active moving parts of the organism." He goes on to say: "I venture to affirm there is not in England a trained professional athlete of the age of thirty-five who has been ten years at his calling who is not disabled."

Now this authoritative statement has swayed the judgment of thousands of thinking people, so powerful are *ex cathedra dicta;* and yet, on the face of it, it is too oversweepingly denunciative to be good argument. I have had these views on the damagement of the involuntary muscles quoted to me again and again, and knew not whence they came, till at last this vigorous passage caught my attention. Such states are indeed possible, and from such causes do they come, in the laborious ranks of iron workers and those who put forth in long days excessive and continued muscular exertion. In this country we have not had many years of systematized amateur athletics from the records of which to judge. They began about 1868, and only slowly grew in scope.

It is beyond measure difficult to get at the facts relative to the present state of even these whose addresses I have been able to obtain, and the mere names are troublesome to get from college and other registers. Systematized records should be kept on the subject in the interest of vital statistics in all organizations even moderately equipped.

Among professional athletes the worst strains must come, as upon the output of most concentrated force alone comes to them honest reward. I have collected the brief histories of a score of these men now living, which at least illustrate how vigorous and sound such men may be, even long after the age limit which Dr. Richardson has chosen to put for them. To these names I can add many, and hope yet to collect more. It may be safely affirmed, however, in conclusion, that the judicious pursuit of bodily exercises either in the line of ordinary avocation, special duties, or sport, tends greatly to maintain and enhance the vigor of both body and mind. Those who practice these steadily through life enjoy the best promise of adding to their years and usefulness as citizens. The vital powers of those who omit these activities through choice or compulsion are not so efficient, and in such the accidents of changed circumstances from their simple routine to sudden activities are far less well endured.

Finally, the hurtfulness of severe muscular exertions short of profound exhaustion is not shown to be otherwise than temporary and recoverable; and lastly, upon investigation, dangers to internal organs and vital centers are comparatively rare. In short, I present brief histories of a few old athletes, now in good condition, with apologies to these gentlemen if by so doing I offend, though it seems to me they have every reason to be proud and thankful to the good power who equipped them so nobly; and, further, in the care which they have undoubtedly exercised to maintain this so well. My long-tried and valued friend, Professor George Goldie, sometime of Princeton College and now of New York, has given me these:—

W. W., age 74; height, 5 ft. 9 in.; weight, 170 lbs. Rowed in 60 boat races between the years '39 and '60, when they rowed in Whitehall boats, taught gymnastics at the Y. M. C. A. until two years ago; now in business in New York, in perfect health; would pass for a well preserved man of sixty; lived a careful life always.

E. S., bareback rider and tumbler; age, 77; height, 5 ft. 5 in.; weight, about 130 lbs. Retired from the circus in 1868 at the age of 56; was as active then as he had been at 30. Owns a quarry and lives on a farm in New Jersey; was living and in perfect health last winter. Not having heard of his death, presume he is still living. Lived until he was 56 the same as most circus men live, steady in his habits, worked very hard, and naturally could not be very careful in his eating, and often had a short allowance of sleep.

Professor V. S., age, 70; height, 5 ft. 7½ in.; weight, 140 lbs.; taught boxing all his life, is still teaching as efficiently as ever; his school is in New York; lived the same as the average man does.

W. W., age, 58; height, 5 ft. 8 in.; weight, 150 lbs.; still teaching gymnastics in his own gymnasium; in perfect health; lives as the average business man does.

Professor A., age, 57; teaching gymnastics in Brooklyn, N. Y.; height, 5 ft. 9 in.; weight, 180 lbs.; in perfect health, a careful liver.

Donald Dinnie, 58 years old; height, 6 ft. 1 in.; weight 218 lbs.; an all-round athlete; is still wrestling, lifting, and throwing weights; comparatively temperate in eating and drinking. I heard a year ago from a friend who saw him, that he was in good health; he is living in Australia.

N. A., 59 years old; height, 5 ft. 11 in.; weight when 35 years of age, 190 lbs.; an all-round circus performer; retired seven or eight years ago; living in Worcester, Mass. The last time I heard from him he was in good health; lived a very irregular life.

There are dozens of old circus men over fifty years old living in retirement all over the country who are in good health. Most of them retire at that age; they are then too old to learn new feats, and as the business is continually progressing, young men take their places. As far as their general health goes, it is better than the average man's. Ord, whom I remember in my schoolboy days in Scotland, was seventy years old the last time I saw him perform. From his actions you would have taken him to be a young man.

Blondin, who must be over sixty, is still in good health.

William, George, Alfred, and Edward Hanlon, the best (in my opinion) all-round gymnasts and acrobats that have been in this country, range from fifty to sixty years.

George Grassick, James Stewart, Laurie Robertson, men getting well on to seventy, were well known Caledonian athletes forty years ago; they are all in good health.

Professor George Goldie, aged 52; height, 5 ft. 8½ in.; weight, naked, 160 lbs.; just as good a gymnast and acrobat as ever; for seven months of the year works longer hours and harder than he ever did; although has had some very severe falls, they have not affected his general health; to-day his health is perfect in every way; he has always lived very temperately. Subject in his managing capacities to numberless severe mental strains and worries, thus superadding to his physical wear and tear.

The Ward Brothers, professional oarsmen, are living and in good health; the youngest of them must be over fifty.

Amateur athletics started in this country in '68, so, of course, there can't be any very old men among them. It is very hard to follow the lives of amateurs, as they give athletics up after a few years.

The most notable examples of amateurs are W. B. Curtis, age, 55; height, 5 ft. 9½ in.; weight, 175 lbs.; in excellent health, though he is confined to an office all day. In '68 I saw him lift 3,230 pounds in harness, curl and put up easily two 100 pound bells, run 100 yds. in 10 2-5 sec. For three or four years, he, along with Yates, held the double scull championship; when over 40 years of age he held the championship at hammer and 56 lbs. weight throwing. To-day he thinks nothing of taking a 40-mile tramp, making four miles an hour all through the walk; very temperate in his habits.

H. E., aged 53; height, 6 ft.; weight, 210 lbs.; was 100 yds. runner, the best in his day; shot putter, weight lifter, heavy weight amateur champion boxer; could to-day, in my opinion, beat any amateur boxer in the country; his spare time now he devotes to bicycle riding, rowing, swimming, skating, etc. His wife accompanies him in all his excursions; she can hold her own with all these, with the best men in the country (I don't mean at racing), but long distances that require endurance; she is well on in middle life. B., is in business in New York in perfect health; his mode of living the same as the average business man's; athletics he has followed only as a recreation.

I add to these the following note from a recent copy of the *London Lancet*:—

Major Knox Holmes, a veteran cyclist of England in eighty-third year, one of a tandem military bicycling team, on a trip of one hundred miles in ten hours, five minutes, came in ahead of rest. In twelve weeks, under training, in a striking manner "developed muscle" in external and internal vasti and rectus muscles. This refutes physiological doctrine that muscle is not newly developed after three-score and ten.

I myself took sparring lessons from Mr. Thomas Barrett at the age of seventy-two, a famous all-round athlete and prize fighter, and withal a charming person. He then could hold his own against most comers, and with us youngsters could play as with children. I lastly give, with his permission, a brief outline of the life of that marvelous vigorous gentleman, Mr. William B. Curtis, and esteem it a great privilege to be allowed to do so.

SKETCH OF THE LIFE OF WILLIAM B. CURTIS.

William B. Curtis stands prominent in American athletics to a degree which is entirely unique. His athletic history is in itself almost a liberal education in such forms of physical feats as are performed by what is technically known as a heavy weight athlete. Added to this are some remarkable records of lighter kinds. He has been so good as to put into my hands a bare outline of his history, to which I have been able to add such comments as seem to me only just. His own modesty forbids him to do more than give me the actual records of feats which to-day stand unbroken, many of them scarcely approached. His best performances were:—

Running,	**50 yards,**	**5¾ seconds.**
	60 yards,	**6½ seconds.**
	75 yards,	**8 seconds.**
	100 yards,	**10 seconds.**
	220 yards,	**23 seconds.**
	440 yards,	**51½ seconds.**
Walking,	**1 mile,**	**8 minutes 51 seconds.**
Hurdle Race,	**120 yards,**	**19 seconds.**
Skating,	**1 mile,**	**3 minutes 18 seconds.**
Swimming,	**100 yards,**	**1 minute 40 seconds.**
	200 yards,	**3 minutes 39 seconds.**
Rowing, single sculls,	**1 mile,**	**6 minutes 49 seconds.**
	2 miles,	**13 minutes 57 seconds.**
	3 miles,	**23 minutes 13 seconds.**
double sculls,	**1 mile,**	**6 minutes 9 seconds.**
	2 miles,	**12 minutes 23 seconds.**

Rowing, pair-oared,	3 miles,	22 minutes 48 seconds.
four-oared,	3 miles,	18 minutes 12 seconds.
six-oared,	1 mile,	5 minutes 38 seconds.
Running long jump,	19 feet 4 inches.	
high jump,	5 feet 1 inch.	
Throwing hammer,	90 feet.	
56-lb. weight,	24 feet.	
Putting up one dumb-bell,	168 pounds.	
two dumb-bells,	100 pounds each.	
Lifting with hands alone,	1,323 pounds.	
harness,	3,239 pounds.	

Mr. Curtis tells me that his father was a poor New England farmer's boy. The son worked upon the farm in various capacities until the age of twenty-four. He then, alternately laboring and studying, worked his way through Middlebury college and Princeton seminary, then became a Home missionary, and finally president of Knox college, Galesburg, Ill. His mother was a New England farmer's daughter, accustomed from childhood to aid in all the work of the house and garden. The father was a man of five feet eight inches in height, broad shouldered and active, but was never possessed of more than average strength, and entirely uninterested in all matters of sport. His mother died when her son, who became the remarkable athlete, was but two years of age. She is described as a woman of queenly presence, magnificent in form and beautiful in face, but her death appears to have been due undoubtedly to phthisis. In a general review of his family history, Mr. Curtis attributes much of his own vigor, and rightly, perhaps, to the fact that all his ancestors were temperate, hard-working people, entirely ignorant of the vice of excesses, and all living and dying in the country. There is nothing peculiar in the ancestral tendencies except that they had all died, so far as he knew, with few exceptions, of consumption. This is rather remarkable, however, as showing how this deadliest of human tendencies can be thrust into complete abeyance or even stamped out.

William B. Curtis was born January 17, 1837, the eldest of a family of fourteen, with one own brother and twelve brothers and sisters by a stepmother, which last died in her thirty-fourth year, also of consumption. Of the children, but two stepbrothers beside himself survived. The first eleven years of his life were spent on the farm, then two at Burr seminary, three at Wabash college, and one at Bell's Commercial college in Chicago. After leaving college he assisted his father for a year in newspaper work, then acted as bookkeeper and subsequently as cashier until the breaking out of the war. He thereupon enlisted as a private, but soon became captain and A. A. G., and served on staff duty until after peace was concluded. Returning to Chicago he was made a member of the Board of Trade, also the New York Gold Room; removed to New York in 1866, but returned to Chicago in 1869, and again to New York in 1878. The Chicago fire of October, 1871, causing the ruin of so many financially, numbered him among her victims, and left him some thousands of dollars worse than nothing. After a struggle of six years and a half to regain his former business standing, which had been in the line of athletic teaching, etc., he gave up the fight and accepted his present salaried position on a paper in New York, where he has remained ever since.

Up to the year 1871, I learn that he always looked noticeably younger than his years, was frequently challenged and made to swear to his age when attempting to vote, as late as his twenty-eighth year; but the hard struggle with fortune after the Chicago fire aged him considerably, and made him look rather older than his years. He undoubtedly was what might be considered a very handsome man. My personal recollections of him go back quite twenty years, and I remember that he struck me then as having unusual clearness of eye and complexion, though always a little pale, and that the shape of his features was massive and handsomely strong. In his clothes he strikes one as being not a large man and rather stooped. This comes, however, of the immense size of the muscles of his shoulders and chest and a tendency not to stand as straight as he might.

While at school and college he was active in boyish games,—swimming, rowing, sailing, jumping, wrestling, running, playing at ball, and such like. He did not then especially distinguish himself. At twenty years he joined a boat club and rowed several races, but not liking the sport, gave it up. At about this time a gymnasium was opened in Chicago and he became a member. It was the distinct impression of his parents and their family physician that the relentless hand of consumption had marked him for its own ; and therefore they rather encouraged his tendency to exercise, thinking that it might possibly prove useful, and if, peradventure, the measure should act in the opposite way and kill him, they resignedly looked upon it as but a slight anticipation of the inevitable. However, in this gymnasium he soon became astonishingly expert, early proving himself the equal of any professional, and while still very young made the extraordinary record, which still stands unbroken, of putting up two one hundred pound dumb-bells at the same time, one in each hand. During this time also, he discovered quite accidentally that he was a very swift runner for short distances. In 1859 he made a series of careful experiments with the then professional champion of America, who was training at Chicago for an important race, and found that he could outstrip him in any kind of a start ; could beat him two or three feet in fifty yards, ran a dead heat at seventy-five, and that this professional could beat him from four to six feet in one hundred yards dash, beyond this point he falling still further behind, at two hundred by twenty-five or thirty feet in the rear, and at a quarter of a mile, by fifty or sixty yards. From then on until 1876, he ran against every amateur he could find at all distances up to two hundred yards, and was never beaten until that year, at which time he was thirty-nine years of age, and at least nine years beyond the age at which sprinters are supposed to retain their fastest form.

During the war he was a mounted officer, riding an average of thirty miles a day for four years, and became so sick of the saddle that he has utterly eschewed it ever since. After the war his life was constantly that of a gymnast until 1868, when some of his associates in New York city coaxed him into a boat to supply the place of a friend who had met with an accident. He rowed this race and many others, largely at their solicitation, for this sport really never interested him, yet continuing thus for quite ten years. In 1868 he became one of the founders of the New York Athletic Club, and ever since has dabbled in various sorts of athletic games. To exhibit his marvelous versatility, it is interesting to glance over his gymnastic prowess,—taking prizes and making phenomenal records on the parallel bars, horizontal bar, rings, trapeze, and at leaping, at putting up one and two dumb-bells, at lifting with hands and with harness ; in open air sports at running at the fifty, sixty, seventy-five, one hundred, two hundred and twenty, and four hundred and forty yards, at a one mile walk, at one hundred and twenty yard hurdle race, at running long jump, at running high jump, at throwing the hammer and fifty-six pound weight. At the individual tug of war I believe he was never beaten. At skating one mile, at swimming one hundred and two hundred yards, at single sculls, double sculls, pair-oared and four-oared and six-oared boat races, he almost always succeeded in bearing off the prize. At about half of these various games he won championships at different times. Many of these performances were, when made, the best on record, and three still retain that honor, namely, at four-oared rowing three miles with a turn, lifting with harness, and putting up two dumb-bells at once.

Mr. Curtis says : "Almost every one considers my weight lifting with harness as the most noteworthy of my feats, but I do not. I pin to this sheet a memorandum which will explain to you how it was done. I have a natural talent for mechanics, and had, by constant experiment and alteration, adjusted my lifting harness so perfectly, and took such care in all my trials, that accident or injury was well-nigh impossible, and my apparatus was so skillfully adjusted as to give to my arms and back just what they could carry, while putting the whole load on my legs, which were herculean in shape and strength. I am too small a man to be a lifter of the heaviest weight, and this distinction is due not so much to my strength, as to my methods, and my mechanical skill. I have seen a dozen men who could have learned in two years to lift 3,239 pounds with my apparatus adjusted to their size and shape, but never saw two who seemed to me able to ever learn to put up two one hundred pound dumb-bells. My adjustable dumb-bells, and all my lifting belts, tables, weights, and other gymnastic apparatus were destroyed in the Chicago fire of 1871. I have never replaced them, and have never since practiced gymnastic exercises or lifting, either for pleasure or with a view to competition."

It is interesting to study with some care the physical history of a man who has been through such extraordinary strains and vicissitudes. He seems never to have had any infantile disease. At ten years of age he injured his knee-cap, which left the joint stiff for three months ; at college had chills and fever. In 1860, while practicing the feat of shouldering a barrel of flour and transferring it from one shoulder to the other, he dropped the object, standing with his right leg somewhat flexed and directly under him and the left leg sticking out to the side and straight, which was broken, as he described it, "downwards and inwards." From this there appears to have been no permanent damage. In 1862, while in the army, he had the measles, and since there was nothing else to do, he kept in the saddle and in the rain for three or four days and nights, finally gave out, and was left at a wayside cabin, without food except the native hog and hominy, and without doctors or medicine. The outcome of this was typhoid fever, a hospital cot for several weeks, and pretty profound exhaustion for two or three months. This appears to have been his last day in bed from accident or sickness up the present time.

In 1867, in New York city, while trying to stop a runaway horse, he wrenched his left leg and lamed his bad knee. To use his own words, "It seemed to me as if I had ruptured some of the fibers which guarded the joint, and that the synovial fluid was escaping in small quantities. Probably I was mistaken, as it eventually healed and wholly, but I could feel what the doctors could not see, and the joint seemed dry and would creak, and needed oiling. I consulted Dr. Carnochan, also Dr. Peters, and got a little comfort. They assured me that it might be a good enough family leg, but would never be able for athletic duty again. They swathed me in rubber bandages from toe to thigh, and rubber knee cap with compress where the lesion seemed to be, and I wore this for two years to my extreme discomfort. In 1882 I wore this while competing in hammer throwing, shot putting, tug of war, etc., and am far from sure that it did me any good. Since after this injury I won the championship of America in running, rowing, hammer throwing, fifty-six pound weight throwing, tug of war, and lifted over three thousand pounds one hundred times, the knee seems to have done pretty good service despite its condemned condition. It still has, however, the ungentlemanly habit of telling me when the barometer falls."

In 1886, while skating, his left foot went down into an eel hole, while his right and forward foot kept on in front of him until "I was split down like a circus contortionist. The boys hauled me on a hand sled to a house, thence on a load of hay to the railroad. Medical examination showed a rupture of some of the fibers of tendon and muscle at the upper part of the thigh. Two months with a cane, however, brought me round all right." Eight months later he fell out of an apple tree and smashed his right shoulder, "breaking off, I believe, a little piece of the shoulder blade. I lived for two months with my arm strapped to my body under my shirt, but it finally got well, and has not since bothered me in any way."

He describes having suffered more or less for thirty years with a mild nasal catarrh, and having tried pretty much everything for its cure. but finally abandoned all and is none the worse for it. He never has taken cold in chest or lungs. "Whenever I take cold it goes to my head, and I blow it out of my nose in a few days." He announces with some satisfaction that he never takes any medicine, doesn't even use liniment for his sprains and bruises,but only cold water. He has never had rheumatism. Being slightly myopic, Mr. Curtis remarks with some satisfaction that his eyesight is as clear now in reading as ever. As to the use of tobacco, he made some early attempts at smoking, but, since the weed gave him unusual horror, he has never practiced it, and confines his use of it "to what smoke ill-mannerly fellows puff into my face on the occasions which I cannot prevent."

After reviewing the rules by which Mr. Curtis has been guided in caring, either intentionally or unintentionally,for his health, one is struck by certain extraordinary incongruities. His habit of living is very simple, and just about such as one might assume would be the choice for a man of active temperament; but, as touching his diet, he has most extraordinarily unwholesome tastes, as he frankly admits. I add in his own language his views on his slow decadence of youthful vigor—a very fair estimate, too.

"My last boat-race was at the Watkins Regatta, in the spring of 1878, and my last public athletic competition at the championship meeting, in the fall of 1882. Since then I have taken no exercise, athletic, aquatic, or gymnastic, for exercise, or with a view to improvement or proficiency, but only for amusement. I think my average falling-off in ability, from my best days, must be about 20 per cent. In some things it may be more, and in some is certainly less. In running it is all of 25 per cent. One hundred yards, formerly in 10 seconds, would now need at least 12½ seconds, and the quarter-mile, formerly 51½ seconds, would now need 1 minute 5 seconds. In dumb-bells about the same as in running. I have at my summer home a pair of 75 pounds, and sometimes manipulate them for the edification of curious friends. Last year I tried them twice, and found it exceedingly difficult to do with them what I used to do quite easily with the pair of 100 pounds each. In rowing, hammer, 56 pound weight, hurdling, skating, and jumping, I think the deterioration is rather less than in running and with dumb-bells. The distance which I used, at my best, to swim in 1 minute 40 seconds, I can and did, last summer, cover in 1 minute 52½ seconds. On the streets, with hands down, I used to walk 5 miles in the hour, now 4½ miles keeps me busy. On a track, stripped, and with hands up, I used to walk six miles in the hour, but do not now think I could do more than 5 miles."

DELSARTE AND HIS WORK.

BY FRANKLIN H. SARGENT.

When a Delsartian presents himself he expects to be cut up. I suppose that is a part of the sacrifice demanded by those who have waited about an hour for the defense to begin. I have not allowed my enthusiasm to run away on paper, but have jotted down a few points that I thought might be of interest to the scientists present, and I propose to make it simply an informal chat.

Naturally the first question that comes up is one involving the definition of the work of Francois Delsarte. I am as unwilling to attempt a definition of that as I should be of the Catholic religion. The work is too large, too inclusive, to be expressed in a sentence or even a few sentences. Delsarte, by the way, was not, strictly speaking, a scientist. He would hardly be called an artist, but he was something more than either of these. I should call him a religionist, for his work was creative and not formulative. The very fact of the man being an inspired discoverer has rendered all that he has written, and a great deal that has been expressed about his work, mystic and rather inexplicable to those who have not studied deeply. That fault is especially evident in the teachers who have gone through the work in a shallow, superficial way, as we do in America. No two teachers of the Delsarte system would be found to express the same idea in the same way. I am inclined to think that the trouble comes from each teacher taking up some particular branch of Delsarte's work and making that a fad and overlooking all the other branches of his work. For instance, relaxation has been taken up and made everything of. Books have been written on it, and many Delsarte teachers know nothing else and do nothing else but relax. The power to be weak is of course just as important as the power to be strong, but the danger is that the system of relaxation will be carried too far.

Delsarte's work as he left it represents rather the idealist's than the practical side with rules, or a system. It represents the work done by many teachers in the way of eccentric movements and practices, which are taken up under the plea of their being natural. It is very difficult to separate in Delsarte's doctrines, as they exist to-day, the alloy from the pure metal. When his daughter was in this country we all hoped that a much better definition of her father's work, and a clearer exposition of his doctrines, would be given, and that was doubtless true so far as her limited study would allow, yet I think those who attended Madame Geraldy's classes will admit that very much has been accomplished in defining the subject in the twenty years that have elapsed since Delsarte's death.

When I once asked Madame Geraldy what she would say the work of her father consisted in, she at once repudiated any intention on the part of her father of upholding a system of gymnastics. She said, "It is the expression of the emotions through the body that my father taught. If one wishes to study gymnastics let him go to the gymnasium." That would seem to mean that her father excluded physical training from his work. But of course that is not so. The fact is this, so far as I have been able to learn, that Delsarte was not able to take the time to work out a complete system of physical training, and simply took up the special exercises that were needed by any individual in curing any special defects or mannerisms. What Delsarte taught was not different from any of the recognized facts that the physical trainer to-day admits. What he taught was founded purely and entirely on his own observations of what he saw in nature. It was not founded on any theory. There is nothing to prove that he was biased by any theory or ethical belief. He was a Catholic, to be sure, and many have thought his principle of the trinity may be derived from that source. The main fact that I want to present to this audience, the text from which I am preaching, is this, that Delsarte did not look upon the body as a machine except as it was an instrument for emotional expression. I cannot believe that he could ever have put his faith in any purely physical movements that were without an emotional meaning. His principles were doubtless derived from a very close study of the body as a symbol of the world's expression, as a symbol of everything that exists, a microcosm. He studied in the dissecting room, he studied at the theaters, he studied everywhere that he could find illustrations to guide him. He founded nothing upon any preconceived notion, prejudice, or theory. His idea of trinity can be realized if we examine the meaning of the idea of trinity, which is absolutely necessary for a complete idea of the man. We must understand unity and diversity before we can comprehend the meaning of the word trinity. The unity of all movements of physical exercise is the very first and prominent thing in all his work. The trinity is of course the ultimate idea, as far as the mind can go. Now, taking the idea of unity and trinity in their fullest meaning, it will be seen that we accept the word trinity and all it implies, for there can be no separation between the body in its movement and the being in causing that movement. Every physical act must have an emotional accompaniment; no action should be made of any kind without some motive, some intention, in it. And the intention must not be simply a desire to create a pleasurable sensation, but it must also be *a feeling and thought* as well. Therefore there is some excuse for calling upon me as a student of dramatic art to talk to a body of physical scientists on physical training.

There is necessarily an absolute connection between the two things. The only object of any physical training is to develop the body as a means of expression. The idea of unity, indivisibility of all parts, is noticeable in the use of breathing in connection with physical exercise, in the co-operation of vocal with physical work.

I can hardly outline what I consider to be the system of Delsarte, because he would not have claimed that he left a system. It is not a science. It has not been reduced to a science. It is still in a transitional condition. Not more than two or three of the so-called laws of Delsarte can be called final laws. Most of them are unfinished rules of expression. But his laws of development, as I understand them, are, first, the training of the body as an instrument of expression; second, the study of the elements of expression; and, third, the applications of the principles to the more involved emotional work.

With the latter we have nothing to do at present, but I wish to try to explain what I understand to be the system as far as it has been developed in physical training.

The first thing is the cultivation of the physical sensibility, of a pleasure in what we are doing, and with that a cultivation of the various senses. But without an inspiring motive, without some emotion accompanying every act, it seems to me that the physical movement is simply a dead thing, like a body without a soul. Herein lies the danger of reducing it to mere mechanism.

The principles of Delsarte, the laws, I will pass over and come down to the more tangible work in hand. The first step that Delsarte would undertake with a pupil would be the correction of any mannerisms that he might find. The correction of these mannerisms might be the relaxing of a muscle, if it is very tense, or the strengthening it, if it be over relaxed. The exercises that Delsarte used seem to be derived directly from the common practices that we see in everyday life, the action of the child, the movements of people in the ordinary healthy state. The first step towards a definite system I do not think lies in the principle of relaxation. Before we can relax any part of the body we must necessarily have power to control our body in an equilibrium or balanced state. Therefore the first step towards a thorough system would be the practice of poise, the resting of the body in its movement in different directions, retaining all parts properly balanced about a common center.

In that matter of poise, to illustrate the absolute necessity of accompanying emotion with movement, I believe it is not right, not proper, to practice a swaying of the body in any direction without accompanying it with some intention of thought or of feeling. The general sway or poise of the body Delsarte taught should be taken first of all with the intention of acquiring a sensation of comfort, of pleasure. And second an intention as a matter of thought, of reasoning, a desire to accomplish something. Physical exercise ought to be resolved at once into a definite expression, a definite attitude or gesture. That is what it is for, not for the sake of developing a certain amount of strength, but it is for the sake of emotional expression. The use of a dramatic speech or situation or intention should be involved in the physical movement.

That is rather blind unless I illustrate it. I remember many years ago coming into a hall and seeing Mr. Steele McKaye making a certain movement, swaying slowly back and forward and reciting the soliloquy of Hamlet, "To be or not to be, that is the question." It may seem ridiculous at the outset but you will find that the deepest, subtlest meaning in the lines is contained in that swaying of the body forward and back. It implies doubt, hesitation, suspense. My idea is that the swaying of the body forward and back is an indication of an intention on the part of the person towards accomplishing something ; he is alternately attracted and revolted. It is a rising and falling : it is like the ebb and flow of any physical part of nature; excitement and exhilaration of thought, the relaxation and control of the parts of the body. I do not think it right to practice a relaxing movement, *i. e.*, the surrendering of any part to gravity, like the state that it has in sleep,—I do not believe it is right to cultivate that condition of the muscular system without using it at once emotionally. When a child on the street sways its arms and makes other spontaneous movements it is doing exactly what I understand Delsarte's intention to be in relaxation movements, abandoning itself to spontaneity of gesture. I would take every relaxing movement and resolve it into some gesture giving all its value and not make of it merely a mechanical thing. The same with controlling movements. I understand relaxing movements to be surrendering the part to gravity but of controlling all the other parts and relieving them. We are not only relieving one part but strengthening another.

Beyond the matter of poising, relaxing, and controlling I think we ought to approach nearer to expression by practicing involution and evolution of movements ; we ought to come nearer to the actual expression of daily life, the bringing in the movement in sensitive impression and the carrying out of movement in forcible expression. These transitions of movement bring us still a step further into something like pantomimic work. The use of the swaying of different parts of the body taken by themselves may be in different forms but always with the intention to resolve them into positive attitude, gesture, or expression of some kind. The opposition of movements of course is a very simple thing and I need not delay upon it. It is a matter of balance, belonging to the law of consistency, that when one part is in use the other part may not be used. The use of any part without the use of another part is contrary to nature and will result in an unequal development. It is not right to practice one muscle by itself without the co-operative use of the rest of the muscular system. The recognition of the laws of Delsarte, or the relation between the center and the extremities, the necessity of repose being back of every activity, the law of motion which is absolutely final, the whole matter of magnetism, the law of expression, all these need to be understood and applied in purely physical training.

Perhaps I may draw the line there and say, beyond that we go into emotional expression, which is beyond the function of the physical trainer. The use of the voice and the practice of the voice is certainly a part of physical training, as much as the exercise of the general body.

As a resumé I would say that as I understand it the ultimate matter is reached in physical work when we have attained perfect flexibility, poise, and strength, all equally important. Repose is obtained by relaxation. Energy is the part of physical work which is usually taken care of so much by itself. In making a plea here I might go farther and deeper but the time is short. But as I understand it finally the whole object of physical training is to enlarge the scope of our powers, and its principal object is to develop the body as a means of emotional expression.

I should like to have a discussion of this point from those appointed or any others, because I know very well that there are many points that I have overlooked and there are errors which may be corrected by those more expert in physical training than I am. But I stand ready to defend the principles which I believe to be Delsarte's.

AMERICANIZED DELSARTE CULTURE.

BY EMILY M. BISHOP, WASHINGTON.

The application of any truth to utilitarian ends needs no defense, therefore I make no apology for presenting much, under the name Delsarte, that Francois Delsarte probably never taught. Emerson says of Plato, "It is fair to credit the broadest generalizer with all the particulars deducible from his thesis"; so it has seemed but fair to credit Delsarte with all that has been deduced from his doctrines.

What is known in this country as Delsarte physical training is usually based upon the laws of Delsarte's "Art of Expression"—outer movements being related to inner states, motion to emotion.

My own teaching, of which I am, of course, best prepared to speak, is known as the Americanized Delsarte Culture. By Americanizing the Delsarte work is meant a broadening of the scope of Delsarte's "Art of Expression," by which it is made of general benefit to all instead of being only of special benefit to a few. Although Delsarte directed his investigations and teaching to art expression—not to health—it seems legitimate to apply the principles of his work to health promotion, for health is the basis of physical condition that must underlie all true expression of man's triune nature.

Before attempting to tell—in ten or fifteen minutes—what this culture aims to achieve, I wish first to specify a few things that it does not teach. Many persons are prejudiced against any teaching that bears the name Delsarte, because they believe that all Delsarte teaching arbitrarily prescribes certain ways to do certain things. People ask about the Delsarte this and the Delsarte that. No wonder that practical teachers of other systems of physical education shrug their shoulders and smile contemptuously at such nonsense; so do practical Delsarte teachers.

Set methods for doing special things would rob people of all spontaneity, all individuality, would make them mere automatons. This culture is not an aimless waving of the arms, it is not "making eyes," it is not attitudinizing. There is no Delsarte walk, no Delsarte standing position, no Delsarte way to breathe, no Delsarte mode of carrying the head, no Delsarte way for doing anything. The only way sought is nature's way. Man can no more *make* natural ways than he can create truth; he can create unnatural ways and create falsehood; at his best, he discovers nature's ways and lives truth. The final aim of Americanized Delsarte Culture is to lead man back to nature's ways, to make him healthy, free, strong, simple, natural.

This teaching seeks first to emancipate people from the bondage of wrong physical habits, from any detrimental influences of heredity, and from the effects of a too exclusively intellectual education. The training of isolated members, as for special purposes, is inadequate. In tuning a piano, harmony is not established until the last string or part is adjusted. So with our bodily instrument—all parts must be in harmonious relation to one another. This secures unity, and unity of action of all the members signifies equilibrium, health, freedom, and beauty of expression.

Americanized Delsarte Culture teaches the natural use of all parts of the body. Not only does it seek to strengthen and to develop symmetrically the entire organism, it also seeks to direct the action of the nerve-force, and to show how to re-enforce this vital quantity. This culture recognizes that all movements are primarily from within, outward; that every movement is the manifestation of a thought, or an emotion, or of the unconscious action of some nerve-center, but it also recognizes that bodily movements react upon the inner powers; that mental and moral states can be recast by physical exercises. To obtain a wholesome reactionary effect from the exercises, principles of psychology as well as those of physiology are applied.

The physiological or functional effect of exercise is growth, or the reconstruction of the body. Action is excited by the tearing down of the tissues of the body, and by the pressure for the removal of the *debris*; thus exercise is forced upon creatures by the facts of decay and repair, which constitute growth. Exercise, in turn, promotes growth. Gymnastics that produce these results may be called the Gymnastics of Exercise.

Americanized Delsarte Culture includes exercises whose objects are not only functional and corrective, but are also educational; educationally considered, they may be called the Gymnastics of Expression. The Gymnastics of Exercise have relation to physical growth; the Gymnastics of Expression have relation to the growth of the mental and emotive natures as well as of the physical. Where the one uses motion for motion's sake, the other uses motion as related to emotion or to a mental state.

In the Gymnastics of Expression are included movements and attitudes that always mean something, that are expressive of certain inner conditions, that, by repeated practice, will enable the inner faculty or feeling related to them to picture itself forth more clearly, forcibly, and easily.

Expression develops faculties as exercise develops muscles. By the expression of any sentiment, as courage or despondency, either by word or action or by both, a quickening influence is exerted upon the faculties from which that sentiment arises. Cells that have once acted in a certain mode tend to further action in the same way; habit is born of this inherent tendency to repetition. A person can encourage bad impulses by giving expression to them, until repetition forms habit and habits become vice. Likewise, higher expression culture becomes higher character building.

Gymnastics of Expression cultivate facility in using inner powers and, by reflex action, strengthen and develop such powers while at the same time they produce the functional benefits of the higher order of Gymnastics of Exercise. Every muscle is brought into healthful action without doing violence to any part of the organism. These gymnastics have been proven to be an important aid in intellectual education. Great concentration is required for the execution of some of the exercises; giving earnest attention to the accomplishment of them trains the mind so that it more readily grasps any other subject.

An individual feature of Americanized Delsarte Culture is relaxation. Energization, only, in physical education is insufficient to meet the needs of this hurried nineteenth century, where "the pace that kills" is habitual with the majority of people; it is as essential to relax as to stimulate. Tension—or an unnecessary amount of nerve-force in any part of the organism—is a chronic state with many; the nerves are wastefully wrought upon not only when the muscles are in action, but when they are not in action.

In the case of adults seeking physical betterment through exercise, an undoing process should in nearly all cases precede an upbuilding one. By mental intensity and muscular restraint, man is restricted, often unconsciously, in nearly all of his movements. This restriction defeats Nature, for she cannot truly express herself through such a high strung instrument. Worse than this, such restriction is a great and an unnecessary expenditure of nerve-force.

To get rid of this injurious tension, the Freeing or Relaxing Exercises are given.

Relaxation means the release of the organs and the tissues from tension; it means a husbanding of the nerve-force; it means the habitual, muscular repose of any part, or the whole, of the body when it is not in action—or energized—for some definite purpose; it means a letting go of one's self at will. This is the only remedy for exhaustion; when relaxation is secured, Nature takes care of restoration.

To surrender self-surveillance, to become passively receptive, is the first step toward overcoming nervousness. Nearly all Americans can energize at will—many find it impossible to relax. They know how to spend, but not how to save, vital force.

The relaxing exercises free every muscle from tension; the nerve-force thus released from the exterior muscles is conserved and reserved at the nerve-centers; overwrought nerves and brains are thus re-enforced. Delsarte's law for control, "Strength at the center, freedom at the surface," is here exemplified. Nervousness, St. Vitus dance, and similar abnormal conditions reveal an opposite state to this one of centered strength; namely, restriction or agitation at the surface, weakness or lack of control at the center.

By undue tension the nerve-centers are depleted; by means of relaxation they are recharged with vital energy.

Relaxation and energization, however, do not define the scope of the physical education sought in Americanized Delsarte Culture. The utilitarian value of grace is also made prominent. While the importance of physical strength and of health is duly appreciated, it is believed that good machines in themselves are not enough. In order to save these machines from tear and to make them wear well, we must know how to run them with the least amount of friction; or, in other words, we must show forth in our movements, "ease in force." This is the scientific definition of grace, given by Herbert Spencer—ease in force.

Languid movements and lackadaisical airs do not constitute grace; rightly understood, grace denotes strength instead of weakness. It is the refinement of power, which no more signifies loss of power than does the refinement of crude iron into steel. Compared with mere brute strength, grace is as Saladin's Damascus blade compared with Richard Cœur de Lion's battle-ax.

Not to mention its commercial, social, and artistic values, from a hygienic point of view alone, we cannot afford to ignore grace as an important part of physical education.

Awkwardness is physical extravagance—a waste of force. Grace is economy of force ; it necessitates a wise adjustment of all parts of the body and a judicious expenditure of nerve-force. Grace is physical freedom, for only free, unconscious movements are ever graceful.

Grace is an essential part of the gymnastics of expression: in order to express the highest phases of our being, precision, harmony, and ease—the three elements of grace—must characterize our movements.

All branches of education and all parts of any one branch, as physical education, should have relation to the *final product*. Developing strength alone has been proven to be inadequate in the last result; it is equally necessary to *save* force, and to know how to best *use* force.

To relax, to energize, and to harmoniously guide the nerve-force in action, constitute gymnastics of Americanized Delsarte Culture. It is believed that no form of physical training will be educationally complete, that does not include these essentials.

In conclusion, I would say that, as far as I know, there is nothing antagonistic between other forms of rational physical education and Americanized Delsarte Culture ; on the contrary, they seem to complement one another. This conclusion is based upon the practical experiment that has been made in the Chautauqua School of Physical Education, at the Chautauqua Assembly, New York. Whether it may not be too general, whether the same harmony that there exists among all the systems of physical education would be found to obtain among different systems everywhere, I am unable to judge—not being sufficiently familiar with systems other than the Delsarte to give an opinion of much value. But this I do know, that a progressive, unprejudiced spirit is the genius of the Chautauqua School of Physical Education, and that excellent results are there obtained by seeking the best in all systems.

DISCUSSION.

COLONEL PARKER, Chicago : In common with a great many I know very little about Delsarte and yet I should not dare to go home unless I said a word about it. I have studied Delsarte. I had a teacher some years ago and took a few lessons. She pronounced me incurable and I discontinued the lessons. But I think there is a profound philosophy in what little I have learned of Delsarte, and it is far reaching. As I understand it, the body has two great functions to perform ; one is attention, the other expression. By attention we receive the action of external energies through the sense organs, the fountain of all intellectual growth. By expression we manifest our conscious activities through the body. In every act of attention the whole body is required. If I should define attention I should say that it is the holding of the whole being, body and consciousness, in the attitude of receiving the action of the external energy acting. And I hold that the perfect act of attention requires the whole being, every muscle, every nerve, and that in a normal body an act of attention requires perfect grace and the use of every muscle in the body. If we could see a person in a perfect act of attention we should have a perfect model to which to lead the world. In the act of expression, the same. Delsarte, it is true, seems to have limited his attention to voice and gesture, but there are other modes of expression, as in music. There are other methods of gesture. The modes of expression are relaxation and gesture, painting, drawing, oral expression, written expression. The great function of expression is this reaction upon the being. It can be covered with one word, and that is intensity. Intensity of thought action means growth. There is no growth without intensity. Intensity of attention enhances intensity of expression. Every act of expression requires, in a normal state of the body, the whole body, every muscle, every movement of the body ; any movement or expression of voice or hand requires the whole body for its action. That is what I believe is meant by the unity of the whole in expressing thought.

Now we talk about natural expression. Natural and savage expression are not synonymous, not by any means. Natural expression means the greatest economy and the greatest ease that are adequate to the most complete expression.

I hold that the work of Delsarte, though it is intimately related to physical training, has nothing whatever to do with physical training *per se*. An attempt to make Delsarte a system of physical training will result, I believe, in failure. But the relation of physical training to the perfect expression is that the muscles are prepared, the nerves are prepared, the whole being is prepared, to utter its thought as a unit. For the two great functions of the human being, attention and expression, the foundation is laid in physical training. Some day when all these modes of expression are used in the education of the child—not in our day—there will be no great need of physical training *per se*, because manual training in itself is the most perfect mode of manual training. But that day has not come, and every muscle, every nerve, of the whole body, must be trained to be ready for attention and for expression. The doctrine of the unity of expression is a doctrine of the future. In our education we cut off a great deal of the power of the nerve centers of thought from expression, so that we cut off a part of the brain from expression. All the old modes of gesture, of reading, of elocution, in which I was trained, made me self-conscious and the most terrible product of education is self-consciousness. Self-consciousness is not a consciousness of self but of others. I have been the victim of that terrible product of education. The intrinsic value of Delsarte is the unit of the whole being in attention and expression, the unit of the thought, the brain, the motor power, the nerves, the muscles, the whole being. It means that when you speak you forget your poor body, you forget everything but the expression itself.

Self-consciousness is an obstruction to thought and to expression. The law of perfect ease demands that there shall be a perfect flow, a perfect stream, of thought and of expression, and any knotting of the muscles retards thought and makes the expression weak. Look at the child learning the old-fashioned writing, the twisting of the hand, the following it with the body, the running out of the tongue—like Sam Weller—and note the result. Now how to get rid of that? I do not know who invented the terms "relaxation" and "decomposition." But relaxation is a scientific matter. The best way to relax is to go a fishing, but there is a scientific use of this other form of relaxation. to unknit your muscles. A child knots his muscles and "decomposition" means to take the life out of those knots. Savage-ness and naturalness are not synonymous. Naturalness means the shortest line of expression, the very shortest consistent with adequate expression, and that is grace. If any one mode of expression is cultivated to the exclusion of others there can be no grace. Grace and strength are all one. Awkwardness is a knotted muscle. It comes from self-consciousness. To overcome awkwardness is the work of Delsarte. In a word, if we train children aright we develop the beauty and grace which they present to us in their wonderful voices and perfectly graceful actions, and there will be no necessity for Delsarte whatever. We meet here to cure evils that never need to exist.

You get perfect physical action. What is it for? You say the aim is pedagogical, to furnish the brain with thought. But suppose the brain is wrong. Suppose you do not give the brain that use which is natural, which it demands by its very nature, what is the use of physical training? The animal is left, but the man is not there until you train him into power. Physical training must go further. Physical training should be guided by its intellectual and moral side.

DR. D. A. SARGENT, Cambridge: The subject of the paper that I was to read is "The Regulation and Management of Athletics," but as it is so late and the paper will probably appear in the report *, I will confine myself to a few words in the discussion on the papers that we have heard.

I heartily agree with Dr. Taylor in many of his conclusions because they have been borne out in practical experience. Men who are not robust at the outset have no business to participate in competitive athletic exercises. The custom of examinations, so that no man can participate in any athletic contest without a thorough physical examination to show his fitness, has limited the number of those who go into athletics. This method keeps out the young men who were formerly injured. At the present time we have induced fifty per cent. to engage in athletics, not for championship or breaking a record, but to avail themselves of these invigorating sports to build themselves up physically, and I might say morally and intellectually, because I think it is conceded that it takes a whole man to play a foot-

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* For Dr. Sargent's paper see Contents.

ball game, or row a four-mile race. If no one has any questions to ask, I would like to branch off into this question of Delsarte. I think I can perhaps say a word to relieve our friends the Delsartians and those more intimately associated with the work, those who have physical training in view in its noblest aspect.

The exception which we take to the Delsarte system as a system of physical training is that it is simply an anomaly. It is not a system of physical training and you cannot make it so in any way. Our friends the Swedes are either fundamentally wrong or our friends the Delsartians are. They are diametrically opposed. If the Swedish system is a system of physical training designed to bring out bodily vigor, then the system of Delsarte exercises is designed—I was going to say—to do the opposite. I will give you an illustration.

The whole theory of the Swedish system is based upon the action largely of antagonistic muscles, the response of the joints to the increased leverage obtained by different positions of the body. If I should ask a class to step forward and charge this way (illustrating), without giving them any instruction, the most of them would do it this way (illustrating), especially if they had been taught Delsarte movements. Coming back they would bend the knee and bring the leg back in this way (illustrating). Why? Because it is easy. It is easier to do than to do it this way (illustrating). We naturally do those things which are easier to do. We economize all the time. On the other hand if I should ask a class to step forward and do it in this way (illustrating), the whole weight would be thrown upon the right leg. There is force in the action. And to bring the leg back to place, forcible muscular effort is necessary, twice as much perhaps as when we bend the knee and drag the leg. There is then this radical difference between the two systems.

In order to get any benefit from exercise you must make muscular effort. You know that it is impossible to get mental strength without mental exercise. We have even introduced mathematics and Greek into our colleges for women. Why? Simply because women's minds are susceptible to the same influences that train men's minds, and by struggling with these intellectual problems they gain intellectual power. That is the way we adopt to gain physical power. The Garden of Eden story has to give way to the modern theory that we are the outcome of a struggle, that every one here carries the marks in his organism, in his whole system, of this struggle. Some of the anatomists will tell you that they can almost decide by studying a skeleton what the occupation has been, by the prominence of tuberosities, by the relative size of different bones and processes. They can tell what the muscular effort has been on the part of the individual. For a person to try to gain muscular strength, to get exercise. without making any exertion is perfectly absurd. It is a question of making an expenditure of one pound with the view of getting back an equivalent in some other form which may be stored up to use at another time. There are occasions where it is necessary to husband resources. We know that people live with very little patrimony who have to get on with a very small expenditure. There are others who have the same amount of means, but they expend it and it comes back with increased amount of capital. So it is with the energy we expend. We gain the energy which we put forth. The lady who gave us that excellent paper on Delsarte told us as much. In order to be courageous, she said, we must do courageous things. In order to get agility we must act with agility. In order to get grace we must act with grace. What does that mean ? Does that mean that we are simply to practice graceful exercises ? Grace is the outcome of consummate strength, some one says. Strength is necessary in order to be graceful and at ease. Grace and ease imply strength. It may not be the strength of a Hercules, but it is an increased amount of strength as compared with the amount of resistance to be overcome. Some exercises of the arms undoubtedly may be graceful from an æsthetic point of view. but how is the muscular exercise ? What we try to do is to put forth energy, to break down tissue, to expend energy that it may come back to us. This subject involves the physiology of exercise, but that is too technical a subject to take up now.

With regard to this law of opposition. It is a very natural thing and may be accounted for on anatomical laws.

All of you know that every muscle, every group of muscles, has its antagonistic group, and if you wish to relax, or one muscle becomes too much exercised and too tense, the tendency is to contract. Take the blacksmith. The fibers tend to contract and his arm is hard. The way to overcome that is to relax it. If you should exercise the extensor muscle of the arm too much what would be the result ? Immobility; the arm would be held rigid. That is a condition we get with a good many athletes, a condition that is termed "muscle-bound," and a great many Delsartians get hold of them and they make them a typical illustration of the effect of muscular work. If a person was to bend the arm in this way (illustrating), the result would be, if you held on to an object that you thought you were going to pick up and found you could not—as if you were going to pick up a dumb-bell and some one had quietly screwed it down—the result would be that you would go down to the dumb-bell. That can be explained on anatomical grounds. So in regard to any extension movement.

MR. SARGENT : I feel very grateful to Dr. Sargent for explaining the differences between the Delsarte and the apparently opposite school. I would like to ask a question here for information, because I am ignorant about it. What is the extent to which light gymnastics are used as compared with heavy gymnastics ? Isn't the tendency toward lighter and lighter gymnastics ?

DR. SARGENT: That is true ; and again in another sense it is not true. It has been only within the last three or four years, certainly the last five years, that women have done anything in the way of heavy gymnastics. I did not introduce anything of that kind into my school, which was established ten years ago, until within five years. Since then among a certain class of women these exercises have become very popular, and certain women show a great degree of proficiency in doing muscular feats, and there is no reason why they should not. There are exactly the same muscles and they are developed in exactly the same way. Anyone who says to the contrary admits that he does not know anatomy.

Question. When the muscles are too tense are you fully satisfied that this exercise makes the muscles pliable ?

Dr. Sargent: We use the Delsarte for that. We use it for men who have been put to work too young. It is very serviceable there. It is essential to have the muscles elastic. We have to overcome certain difficulties in boating. Take young men vigorous enough to represent a university crew and one difficulty is to have them relax their wrists when they grip the oar, for feathering. It is difficult to feather and they commit that breach of etiquette which is called "catching a crab," which is likely to bring forth disagreeable comments. So also in regard to fencing and boxing we have to relax antagonistic muscles. The difference between those who do a thing gracefully and those who do not is in the power of relaxing muscles. Women have muscles more relaxed than men. To illustrate, take the facility with which women will stoop down and touch the toes without bending the knees. As a rule women will do it much more readily than men. It may be said that is due to the fact that women's legs are shorter, but it is also due to the fact that their muscles are more relaxed. It is commonly known that women can kick proportionately higher then men because they have the power of relaxing the large muscle that goes under the knee. Women need exercises that will give them more tone, not relaxing exercises.

Dr. Madison Taylor: I think I could reconcile these two statements. I agree with Dr. Sargent in the main, but I think he has left out of consideration one or two essential points, in not giving enough value to the Delsarte system as an athletic system. By concentrating effort to do a certain act, by conversion of energy and working through lines of the least resistance, you can bring about a certain result. You can do the thing with the least amount of waste force. I think that is what the Delsarte adherents are working to attain. Take Dr. Sargent's own illustration of boxing. The attitude of boxing has to be perfectly equipoise and when the blow is made it must be made in the tenth of a second. Not only must you do it to bring about a certain result on the opponent's surface but so quickly that he cannot respond to the stimulus of his own brain. There is inability to make the mandate of his will functionate in his own muscles. While that is not always graceful, yet the best doing of the physical act is unquestionably a graceful act. All evidence of awkardness is lost muscle force. The athlete in his perfection, not the one who has been trained to do the best feats, might have been a more perfect animal if he had learned to do them better, with less wear and tear. Take the runner who has a natural aptitude for running, an aptitude about which no one knows better than Dr. Sargent. There must be certain poise of muscles, certain length below the knee, etc. When he runs there must be absolute grace in his movements, other things being equal. The man who runs most gracefully must do it most efficiently in proportion to his own powers. Not that another man with a trifle better poise might not run better than he and run faster or longer, but in so far as his power is concerned he does it best by doing it with the least friction or loss of force. These are more reconcilable points than he regards them, although as a means of physical education they cannot be considered so efficient as more active measures. Take the largely growing interest in lawn tennis, which I believe to be competent to relieve us from many of the disturbances which those of the older generation had. Through this exercise one gets perfect equipoise and graceful efficiency, with the least measure of lost force. Our girls are trained to find in the tennis field an incentive to sport and that is what makes physical exercise most efficient. The fault of athletics used to be that too few attempted them, as only about one in ten could win distinction in them. But a great many can do well if an incentive exists. I think that tennis is interesting and valuable because it gives incentive. You drive a ball over a certain obstruction in certain sorts of ways that teach balance and to rapidly co-ordinate the muscles. You have to perpetually and efficiently direct your mind to the point you have to make. The ball must be sent in a certain direction. Plenty of people play tennis efficiently who are not graceful, but they would be much more graceful if there were no waste of nervous energy, if they did not waste their muscular force. While I agree with Dr. Sargent that Delsarte has been misunderstood and all that we know is certain elements which have not been clearly explained, I think we have grasped the fact that the animus is to bring the greatest possible efficiency and grace to persons who have bad muscular habits. These two systems, which are traveling in parallel lines, may, I think, safely inosculate. The illustrations might be carried farther, but I think I have said enough to point out the grounds on which this may be considered.

Mr. Arnold of New Haven : The question arises, What are natural movements? Darwin shows that modes of expression do not agree. They are not the same in persons of different nationalities and races. We cannot establish a universal system because we could not express all emotions by definite movements. We have been told that this system helps in character building. If we are told to perform certain movements that we are told express·something and we do not really *feel* that way, is it not false ? And if we get into the habit of doing that will we not, by repeating an expression that we do not feel, get the habit of expressing through our motions and perhaps our speech, something that we do not feel?

Dr. D. A. Sargent : I think the point is well taken. Different nationalities do not have the same method of expressing emotion and there is danger of acquiring mannerisms. It is said that young ladies learn to express certain emotions by certain gestures. If a young man calls on them they are able to carry on a mute conversation in this way. That is a mannerism, an affectation. I know of schools of elocution where these affectations are taught, really incorporated into the system, and where pupils are taught to make certain gestures to express emotions which they do not feel. But here comes in the great question of acting, which I would not dare to start here in an audience like this for fear we should become involved in depths that we could not escape from.

Colonel Parker, Chicago : I do not know much about Delsarte, but from what little I have heard I utterly repudiate, everlastingly and persistently, the idea of anyone being taught to express emotion by gesture. Delsarte everlastingly opposes that. There is another point. Darwin says that gesture is a universal language.

Dr. Sargent : Undoubtedly.

Col. Parker : There are some national mannerisms, but the point that I have in mind is, that affectation of gesture is simply a relic of the old elocution ; it is not Delsartism at all. If you see a young lady—or a young man for that matter—posing in that way he is imposing on you if he calls it Delsarte.

Dr. Hartwell : I thank those interested in Delsarte for the part they have taken in this matter. If there is anything that can be considered an authoritative exposition of his system in which three exponents agree I should be willing to read such a book. I have tried to find such a book. Of those that I have seen the physiology was unintelligible. If I can be referred to any authority that will give a clear idea of what is involved I should be thankful to be put on the track. There are certain terms that puzzle me. I do not know what is meant by "relaxation." I do not know what is meant by "inner tension" and "outer tension." I am open to correction. The terms are not the terms of the physiologist. Muscles that have no nervous energy sent into them, which are as perfectly relaxed as may be, may be shown to be over tense and over stretched. Possibly the physiologist's term "tension" and the Delsartist's term "tension" are different things. How is it ?

Col. Parker : The beauty of Delsarte is that it is not a system dependent on line upon line and precept upon precept and muscle upon muscle. It is a principle which you have to study yourself and apply yourself. Any method which you can find out all about in a book, which is fixed, is no method at all, or it is a pretty poor method.

Dr. Hartwell : It is curious that the Delsartists have fallen upon one of the most recondite problems in physiology. Perhaps the relaxation of a muscle is as much a physiological process as contraction. I would like to know what "relaxation" means in terms of nerve and muscle.

Mr. Sargent of New York : Dr. Hartwell has struck at the weak point of Delsarte. We do *not* know. That is our weakness. We should know more before we attempt to defend ourselves before scientific men. That I state for myself. We are using terms that we think we understand, taking the definitions that we find in books of physiology and anatomy, but we find there is a difference of opinion between anatomists. We are not thoroughly informed about anatomy and physiology, not enough to make a thorough system of physical training, and I, individually, am quite ready to admit with Dr. Sargent and others that we have not yet a thorough system of physical training, and yet Dr. Sargent admits the value of the principle which we are attempting to explain and teach, the principle which we are following. The application, the means of teaching, the terminology, may be obscure but the principle we assert is true. All that we aim for is to use nature's methods and to form natural habits.

DR. HARTWELL: I am profoundly thankful to Mr. Sargent. I agree that there is a deal of truth in what he said this morning. It is quite explicable that when one learns a new trick, a new use of his hands, that when he can do it naturally he will do it in a way which is not cramped and stiff, because there will be a co-ordinated movement of all the parts. They will perform their offices in due sequence and order. There is proper regulation of the turning on of the nervous stimulus. But if you were teaching a child to write, or if we were teaching ourselves to write in a new way, we should almost inevitably—perhaps if we were Delsartians we might not—over enervate the muscles and produce a cramp. If by freeing them you mean only turning on what nervous force is necessary, making paths through the nervous system, following the lines of least resistance, why then we have many points in common.

COL. PARKER: That is just what we do in teaching children.

DR. HARTWELL: Not long ago in learning certain manipulations in massage I was very much struck with the keenness of the instructor, who was not an ordinary rubber but a professional surgeon in a German university. I was struck, I say, with his keenness in physiological insight. He was conscious of the condition of my muscles. "Stop," he said, "you have learned enough to-day; if you go on that way you will go all wrong." It was an over-nervous condition. You may call it "inner tension" or "outer tension," it was over-nervation. If you go as far as you can without producing muscular and mental cramps, weariness or exhaustion and their resulting emotions or the beginning of tremor; if you have learned where to stop, you have learned a valuable lesson which will be productive of the best results and will be deserving of our thanks.

Adjourned at 5.30 P. M.

The paper by Dr. Sargent, not read at the conference, is as follows :—

THE REGULATION AND MANAGEMENT OF ATHLETIC SPORTS.

BY D. A. SARGENT, M.D.

No one familiar with the subject can question the value of athletic sports as an aid to health, and as a means of physical and mental development.

My theme, therefore, is not to praise athletics or to inquire into their physiological or psychological effects, but to consider how they can be so regulated and managed as to do the greatest good to the greatest number, and prove an aid and not a hindrance to the general cause of education.

To those who have given the subject but little thought, this may seem a simple thing to do—but let me assure them that this is one of the most difficult problems which our school and college authorities have to solve.

Just why this is so cannot be fully stated within the limits of this paper. Some of the difficulties, however, may be briefly summarized.

1. The peculiar nature of many of these sports; the tendency being for all antagonistic games to exterminate themselves, unless carefully protected by strict rules and regulations.
2. The natural tendency to professionalism and the accompanying decline of interest in amateur sports. This evil has been the bane of athletics, from the time of the ancient Greeks, down to the present day.
3. The mercenary motives, including the evils of betting aroused by the pursuit of sport as a business, instead of a recreation or a means of physical training.
4. The prominence given to athletics by the public press.
5. The attitude of educators and distinguished men in regard to them.
6. The position of the young men themselves.

Did the time permit, it would be interesting and instructive to take these questions up in order, and consider the influence they have had upon the growth and character of athletics.

I shall speak at length of only two—the position which the educators and the young men have taken towards athletics during the past twelve years—as a basis for what I shall have to say concerning the regulation and management of these important exercises.

Every writer on education has made the training of the body an essential part of the education of the young. And the lives of the foremost men in art, science, and literature, the leaders of thought and action in all ages, have taught us the value of a strong constitution and a hardy physique.

Notwithstanding the experience of the past, and the theories advanced by the best educators of to-day, the physical training of the young is a matter that has been largely left in their own hands. Many think that the love of sport, and the enthusiasm of youth, will furnish all the exercise necessary for the maintenance of health. But no recognition was given to sports by our institutions of learning; and no provision made for their practice, until recent years. Their existence has been the result of a struggle between the young blood and the old, in which the former has been gradually gaining the advantage.

Our college faculties have, for the most part, vigorously opposed every advancement of sport, from the introduction of the bowling alley, to the light-oared racing shell.

There is a tradition that the student that first brought a boat to Harvard was suspended from college for six months.

But the opposition has not been confined to sport, it has extended to every form of physical exercise. It would seem that institutions of learning were still hampered by the traditions of the church and monastery, for every attempt to educate the body and treat it as a co-worker with the mind has been frowned upon and discouraged.

Notwithstanding the fact that most of the arguments used in favor of physical training were formulated from facts and principles taught in our colleges and medical schools, these institutions have not taken the initiative in starting this movement in physical education, but have gradually yielded to the pressure of public opinion which a few enthusiasts on the subject have created.

Some of our larger institutions have recognized that sports and games could only play a part in a wise system of physical training, and, considering their natural limitations, only a minor part. For this reason they have built gymnasiums designed to meet the wants of all classes, and appointed instructors more or less qualified to look after the needs of all students.

But gymnasiums cost money and good teachers are not to be had for a small sum. Without the proper equipment and teachers of intelligence and ability, the gymnasium grows dull and uninteresting, and fails to excite much enthusiasm in young men already wearied with routine work.

When left to itself, it soon becomes a training school for specialists, and is rarely frequented by those who most need its advantages. The enthusiasm of the times is for athletics, and inasmuch as they are largely supported by subscriptions, colleges that are wanting in resources, and are not provided with well-equipped gymnasiums, urge most strongly the practice of recreative games.

It would almost seem that the opinion of college faculties with regard to certain sports was influenced by the standing of their various athletic organizations and the facilities offered for the practice of certain exercises. Schools and colleges vie with each other to see which can present the most attractions in this direction to aspiring youth, and when it is imagined that the winning of a boat race or the gaining of the baseball championship may be said to gain for the institution ten or twenty students, the victory seems worth striving for, and it can readily be seen how evils once endured are soon pitied and then embraced.

In such an atmosphere and under such fertilizing, it is hardly surprising that athletics, a few years from their inception in some of our colleges, acquired a rather rank growth.

The peculiar phases of this growth and the different conditions under which it flourished before the winnowing and reforming process began, may be inferred from the remarks of several college presidents on the subject. Let me quote them:—

"The college is not intended for promoting boating. Yet in college there must come up an interest which promotes physical culture. Young men must have exercise, relaxation, and social pleasures, and they find these in such emulative exercises as boating. We think boating a good thing, then our maxim is, a good thing should be well done. But boating must be a pursuit of the student's own choosing. I have little faith in forced attendance on physical exercise. To make a success, the student's heart must be engaged in it. Being voluntary, the boating interest of a college is just what the students make it. Students will give boating its position by the public sentiment they maintain in regard to it. Concentration is a lesson of boating. A man cannot pull, who cannot give his whole mind and strength to the work."

"We should all be disappointed, even the oldest of us, if our college did not maintain her pre-eminence in the coming contest this week."

These are the sentiments of the late ex-president of Yale College, as reported from his remarks at the inauguration of the boathouse some years ago, and from his speech at an alumni dinner.

The ex-president of Columbia is quoted as saying on this subject: "I do not think that the athletic exercises of the students interfere at all with their intellectual labors; but rather believe that they are of decided benefit to the young men, augmenting their stock of health, and increasing their powers of mental application. We have not found that a fondness for athletic exercises tended to render students indifferent to their progress in class, or influenced them, when exercising their right of selecting subjects for study, to choose easy branches, or diminish their application. On the contrary, we have had to restrain some of our athletes from undertaking more intense application to a wider range of study than we deemed advisable, and some of our brightest graduates have been men who distinguished themselves in athletic sports."

Let us see what other college presidents have to say on the same subject. We quote from one of the annual addresses of the ex-president of Brown University.

"The multiplication of students' clubs, associations, and societies that call for intercollegiate games has now reached a point where some kind of restrictive action would seem to be called for. The number of absences required by these games is more than is consistent with the best results of scholarship. Athletic sports are admirable when engaged in as a means to health and physical vigor; but when pursued for their own sake, or as a preparation for intercollegiate contests, to which college duties are to be subordinated, the result cannot fail to be mischievous."

The ex-president of Princeton College expresses himself as follows on this subject:—.

"The keenness of the pleasure felt in athletic sports has led to excesses. The evil has appeared, not so much in the exercises of the gymnasia, as in their accompaniments, especially the competitive college games. What is immeasurably worse, they come to absorb the interest and enthusiasm of the young men, who continue their academic tasks, but continue them as tasks, seeking to have only so much scholarship as may enable them to pass at the examinations, and ever seeking to be relieved from their lessons to go to more genial pursuits."

In the annual report of 1882 and 1883, the president of Harvard said:—

"Intercollegiate contests in athletic sports demand further regulation, by agreement between the colleges whose students take part in them. They are degrading, both to players and spectators, if conducted with brutality, or in a tricky or jockeying spirit; and they become absurd if some of the competitors employ trainers and play with professional players, while others do not. The opinion of the authorities of Harvard College upon this subject is perfectly distinct; they are in favor of forbidding college clubs and crews to employ trainers, to play or row with professionals, or to compete with clubs or crews who adopt either of these practices. They are opposed to all money making at intercollegiate contests and to the acceptance of money or gratuitous service from railroads or hotels, and, therefore, to all exhibitions or contests which are deliberately planned so as to attract a multitude and thereby increase the gate money. In short, they believe that college sport should be conducted as the amusement of amateurs, and not as the business of professional players."

We have quoted at some length the remarks of the several college presidents on this subject, because we believe they express not only their sentiments but also the prevailing sentiments of their respective colleges and the constituency that supports them. That there is a slight difference of opinion among them, and a variance of views as to what constitutes the principal evil in question, is apparent to all. That there is any logical sequence between the remarks of the first president made several years ago, and those of the following presidents, may not have occurred to you. But to my mind there is almost a direct relation of cause and effect between the assertion of President Porter, "that to make a success of any sport the student's heart must be in it," and that intensity of feeling which leads President McCosh to regret that "the keenness of the pleasure felt in athletic sports has led to excesses." We say that there is a logical sequence between the advice given by President Porter, that "a man cannot pull, who cannot give his whole mind and strength to the work," and the restraint that President Barnard has found it necessary to exercise over some athletes, to keep them from undertaking more intense application to a wider range of study, and the broader assertion of President Robinson, that "the time required by these games is more than is consistent with the best results of scholarship." When President Porter said to the assembled alumni, "we should all be disappointed, even the oldest of us, if our college did not maintain her pre-eminence in the forthcoming contest," he undoubtedly uttered a sentiment which met a ready response in every undergraduate's heart. It was a sentiment well calculated to arouse the enthusiasm of all those that love their Alma Mater, and induce them to make every effort to bring victory to her shrine. Under such circumstances, it would naturally be expected that the zeal and ardor of youth would lead them to overstep the bounds of moderation and plunge into excess. With a president, a faculty, and a body of alumni urging the students on, but assuming no responsibility for their action and exercising no guiding influence over them, with a motto which might well read, "*Win, win, win* if you can, but win anyhow," we have all the conditions necessary to develop such tendencies in our athletic sports as called for the opinion from President Eliot that "college clubs and crews should be forbidden to employ trainers, to play or row with professionals," etc.

The opinions expressed on this subject by prominent men who are interested in youth and education have been largely influenced by their own experiences and the experiences of those with whom they have been associated.

As a rule, those who paid the least attention to physical training in their younger days, and have suffered from this neglect ever since, are the strongest advocates of the unregulated system of athletics. On the other hand, those who entered into the sports too vigorously, sacrificing more time and energy in their youth than was necessary to keep them in good condition, and perhaps carrying their practice to such an excess as to permanently injure their health, are now apt to be the extreme radicals who advocate the total abolition of all sports and games. Between these two classes are those representing every variety of opinion, some of them so absurd as not to be worth mentioning. But the most conservative sentiments—those that call for regulation and reform, and are the most commendable—come from men who have been athletes themselves and practiced the sports for the love of them, as a form of exercise and as a means of development.

Perhaps the most serious evil which threatened to impair the usefulness of athletics while their abuses were agitating the community was the position of the young men and especially of our college students in regard to them. In this position, however, they had the sympathy of all who were interested in the cause of physical training.

That their position was a false one, and wholly untenable, so far as the continuance of athletics is concerned, no one can deny who has given the subject a careful consideration. But that our young men should have arrived at their conclusions under the circumstances was perfectly natural, and, from their standpoint, perfectly logical. They had heard eloquent addresses on the value of health and strength, and read persuasive arguments in favor of physical exercise. They had seen thousands of dollars given to the education of the mind, where one dollar was devoted to the improvement of the body. Every one had said that athletics were good things and that they should be encouraged, but every attempt to give them recognition, not merely as sports, but as essential parts of college training, and to bring them under responsible supervision, had been met with a sneer of ridicule and contempt. The athletic associations as they exist to-day in our colleges are largely due to the efforts of the students themselves. Rules and regulations have been borrowed from the English and Scotch associations, but the working policy of the different clubs has been principally shaped by the observation of results. It may be said that college athletics were first practiced for the recreation and amusement of those who participated in them. But all sport is spontaneous and simply arises from the pleasure of acting. That a number of men should feel like rowing or playing ball, every day at the same time, for the fun of it, is not probable. Where the sport or game requires more than one, there must be something like a mutual agreement as to the time of meeting, part to be played, regularity of practice, etc.

To insure all this, there must be a motive or an ulterior end. Perhaps the motive is physical training for the health's sake. This is a worthy object but hardly sufficient to bring eight, nine, or eleven young men together at the same time day after day, for two hours' exercise, especially if they enjoyed vigorous health at the outset. A stronger motive or stimulus is needed. This is found in rivalry and competition.

Class crews, ball nines, and football teams are formed, and the different classes support their respective organizations with money and enthusiasm. Other associations arise with the same end in view, and, finally, college or university organizations are formed.

To satisfy the desire for competition and to afford men the pleasure of measuring their strength with others, matches are arranged between classes, and rivals are sought from other colleges. Here the danger begins, and unless the evils are met as they arise the unmistakable tendency is toward professionalism. The approach of this danger is so insidious that both students and faculties are slow to perceive it.

A college community is often called a little world in itself, but it is a world governed by the same passions and impulses as the world at large. As far as the physical condition of the athlete is concerned, they represent no one but themselves—but in their efforts to win a victory from their antagonist they represent the ardent hopes and earnest desires of a large constituency. This constituency governs the movements of the athletes and regulates the standard of the games. They pay liberally for the support of athletic organizations and want affairs conducted according to their tastes.

A half-hearted game of ball, or a spiritless boat race or foot-ball contest, would be regarded with derision, and a long series of defeats would deprive the athletic teams of their accustomed support. Every college wants its crew, nine, and eleven to do their best to win. The championship is the goal for which all are striving, and every effort must be put forth to attain it—even if it has to be accepted by default.

The ardent desire for victory gives rise to improved boats, seats, oars, and rowlocks, in order that the crew using them may gain some mechanical advantage over its adversary.

The same desire induces the different organizations to avail themselves of technical skill and to accept the services of those who boast of this possession.

A few points on the manipulation of an oar, the curving of a ball, the handling of a bat, etc., may bring victory to the favored team.

The employment of experts or practicing with first-class amateur organizations, and finally playing with professionals, will greatly enhance the chances of success.

If two afternoons a week will not afford the necessary practice to enable a team to keep pace with its rivals, then six afternoons a week must be devoted to it, and, as the standard advances and the spirit of emulation increases, a part of both forenoon and afternoon must be surrendered.

But twelve hours a day given to practice for fifty-two weeks in the year would not make a ball player, an oarsman, or a runner, unless the individual selected possessed the essential requisites at the outset.

To get an athlete of acknowledged ability at the start is a great gain to an association, and a young man of this class is much sought for. If he is connected with a preparatory school and is intending to go to college, he may be induced to enter a certain institution through the regular channel. If his natural proclivities or his means of living do not incline him towards the institution that most desires his athletic ability, superior social advantages, indirect assistance, or even pecuniary inducements are sometimes held out to him. But good athletes do not abound in fitting schools and the demand is always greater than the supply. The opportunity to take a special course offered by many of our colleges opens a way for desirable athletes who may not be able to enter the regular course. In this way men whose avowed intention is to engage in athletics for pleasure or as a matter of business may find access to some of our institutions of learning.

In some of the colleges where the facilities for entering special or graduate courses are not presented, and the competitive spirit runs high, desirable athletes have been engaged and paid a regular stipend for the express purpose of playing ball, etc.

In order to get the best practice and experience, college men have often availed themselves of the opportunity to play on professional or semi-professional clubs during the long summer vacations. They claim to have received no money for their services, and in this way keep up their standing as amateurs in the college clubs.

As soon as their connection with college is over, however, some of these men gravitate naturally into professional organizations, and during the past few years a score or more of college bred men have been playing base ball throughout the country as a matter of business.

Here we meet the same tendency in the college community that we find to exist in the community at large. It is the graded step from the amateur to the professional.

Another difficulty our young men have had to encounter in the management of athletics has been in the collection and disbursement of funds.

It is estimated that the annual cost of sustaining the different athletic organizations at Harvard is about $30,000, and nearly the same amount is expended by Yale on her athletic interests. Formerly the various organizations were sustained entirely by subscriptions—the undergraduates and graduates from far and near contributing liberally to the support of the "crew" and the "nine," etc.

This expense fell heavily upon the smaller colleges, finally compelling them to concentrate their energies upon one or two sports.

The larger institutions also have felt this pecuniary strain and in order to meet it have been obliged to resort to various methods, such as giving entertainments in the form of concerts, lectures, dramatic and gymnastic exhibitions, etc.

In this way the lovers of one kind of amusement contribute to the support of another kind.

Some of the competitive sports and games, such as base ball, foot ball, and track athletics, have resources within themselves. They are popular with the public and by conducting them within closed grounds and charging gate money they can be made to pay something towards their own support.

In the opinion of many, this course is advisable. When college officials venture the assertion that field athletics ought to be self-supporting, it is not surprising that the managers of athletic associations should try to make them so. With this end in view the games are conducted on business principles. The expenditures are kept down to a minimum, while the income is made as large as possible.

If a railroad company offers free passes, or a hotel proprietor opens his house to competing athletes, or if retail dealers or manufacturing companies want to print the programmes free of charge as an advertisement, etc., their propositions are generally accepted as a matter of business, for money saved is money earned.

If popular sports are to be made self-supporting they must be made to draw.

In athletics as in everything else, nothing pays like success. If an ordinary gymnastic exhibition is given, the expenditures are likely to exceed the receipts. Let it be quietly understood, however, that A and B, two heavy-weight sparrers, are going to try and "knock each other out," and the athletic treasury will be replete.

So it is with field sports. Nearly all of Harvard's practice games are sources of expense. A game in the championship series, however, always draws. In this respect the club that holds the college championship has a pecuniary advantage over the others, especially if so situated as to be able to play some of its games in large cities.

The need of money, and the difficulty of gaining it either by subscription or by gate receipts when not successful, is a strong inducement to struggle for supremacy. Victory means money in the treasury, and defeat a lingering debt.

The managers and officers of the various athletic organizations are judged by their fellow students according to what they do. They wish to make as good a showing as their predecessors, if not advance a little beyond them. This means to defeat their foremost adversary and leave their association free from debt. If they do not succeed in accomplishing these two objects, their season's work is considered a failure, and they get little credit for the time and energy which they have given to the cause, even if they are so fortunate as to escape censure. On the other hand, should they succeed in winning the championship or in vanquishing their strongest opponents—at any cost—their cup of joy is full. They are congratulated by students, faculty, and alumni, the newspapers herald their names abroad, celebrations and banquets are given in their honor, their social and business prospects are assured, and their records and achievements are handed down to future generations.

Again I ask, under such conditions, such allurements, and such incentives, is it strange that our young men should become enthusiastic over athletics, and strive for the coveted prize with its honor, glory, and renown?

Is it not really a foretaste of life in the world at large, and are they not judged by the same standards? And if we were disposed to moralize at this point, could we not in truth say that these athletic victories, including the preliminary training that leads up to them, are worth a hundred fold more to the present and future generations than many of the senseless bawbles and inanities for which the world is struggling?

But the question that most concerns us, is, how this tendency is going to affect the cause of athletics.

We have seen that the educators are divided in their opinion as to the evils that have arisen in connection with the practice of these exercises, as well as how to meet them, while the students from their standpoint can see no evils, and are practically united as to the manner in which these sports should be conducted.

It is for us to consider how these different attitudes are to be reconciled, and how these opposing forces are to be brought to serve the best interest of physical training.

If the highest degree of excellence in any sport is the thing to be attained, if the winning of the championship is to be considered the only indication of success, if the physical supremacy of the few is to be maintained at any cost, and the amusement of the many catered to, and if athletic sports are to be pursued as ends in themselves, rather than a means of physical training and development—then the tendency of athletics is in the right direction.

It is the natural process of evolution from crudeness to perfection that marks the progress of every art, as an art.

The popular demand for physical exercise, the enthusiasm of youth, the love of excitement, the pecuniary interest, the influence of a certain portion of the press, and the policy of some of our institutions of learning, all tend to foster the professional spirit. Unless this tendency is met by healthful measures, our popular sports are doomed to lose their hold on public interest and will eventually become sources of evil rather than good.

In considering the remedies for the natural evils that invest athletic sports, our first thought is to let them assume such proportions as to bring about their own relief. We are told that professionalism is a disease that cures itself, and if one sport sinks into degradation, other sports will rise to take its place. We regret that we cannot share this faith. Three thousand years have witnessed the invention of but few sports. Ball playing and boat racing have come down to us from distant ages, and lawn tennis, one of the most popular games of the present day, is only the revival of a game played by the ancients. We want all of our sports. The physical stability of our people is not so well assured that we can allow these health-giving games to lose their hold upon the public.

In the light of this constant tendency to degenerate, we cannot help thinking that the hearty co-operation of all earnest, thinking men is called for in an attempt to keep our recreative games up to the amateur or gentlemanly standard.

The first remedy we would suggest is that prominent educators and college officials recognize athletic sports, and come to some agreement as to the part they are to play in a system of education.

In view of the prominence given to these sports in our colleges, the expense of maintaining them, and the evils that are associated with them, a college faculty that does not announce its policy, and define its position with regard to this question, is, in our opinion, false to its trust, and shirks a great responsibility.

A subject so important and of so great popular interest has naturally not escaped the notice of these faculties.

In most if not all of our colleges, it has long been recognized that athletics were good and necessary; in many, if not most, it has not escaped recognition that athletic contests need regulating.

With this object in view an intercollegiate athletic conference met a few years ago, and drew up the following resolutions with preambles. [Read resolutions.]

These resolutions were finally submitted to the several colleges. In order that the regulations should be effective it seemed best that they should be accepted or rejected as a whole, their adoption at any one college depending upon their adoption by at least five others. They were adopted as a whole at Princeton and Harvard, rejected as a whole by Yale, and accepted conditionally by a few of the smaller colleges. One college was in favor of adopting the first resolution but was opposed to the third. Another college approved of the third but condemned the first, and so on through the entire number. The difficulty was that no one college (Harvard and Princeton not excepted) was satisfied with all the resolutions, and that no one resolution was satisfactory to all the colleges. As a result, the conference withdrew the intercollegiate resolutions, and each institution was left to stand by its own.

The failure of this attempt at joint regulation and control of athletics was due to one great oversight, *i.e.*, the part which the students and alumni were to take in the controversy. The committee drew up its regulations under the presumption that each college faculty could and was expected to govern the actions of its own students. This was perhaps a natural presumption, but it proved to be a misleading one. Faculties and governing boards are influenced largely by the opinions and desires of their constituency, and it matters little how important or necessary the measure, if it fails to commend itself to the average intelligence of the college community it cannot be adopted and sustained. Some of the committee took this lesson to heart, and from that time they have made their appeals to the students and community at large.

In the mean while the evils which were so apparent to the committee at that time continued to increase until the year 1885, when the Harvard faculty found it necessary to prohibit all intercollegiate foot-ball games until the rules could be improved, and provision made to enforce them. This prohibition was maintained for a year. A little later, Harvard's athletic committee were obliged to check certain evils that had become connected with boating; to take measures to lessen the amount of betting at intercollegiate contests; to reduce the number of games played out of town; to exclude professional attendants from the floor of the gymnasium, and all trainers "so called" from the grounds of the university. Recognizing, however, that the students should have some one to overlook their sports, the committee recommended the appointment of an official trainer, who should be announced in the catalogue and paid by the corporation.

Just as the efforts made by Harvard's athletic committee were beginning to take effect, and reform measures were thoroughly established, a committee appointed by the board of overseers in 1888 recommended the prohibition of all intercollegiate contests. The votes of the overseers following this recommendation led to a thorough examination of the whole subject by a committee appointed by the Harvard college faculty. Concerning the report of this committee President Eliot says:—

"This report, with the accompanying statistics, disposed of some of the common objections to athletic sports and intercollegiate contests, demonstrated their general utility, and set in a clear light the improvement of the average physique of the students which the gymnasium and the various sports had together brought about. Although the report contained many criticisms upon the present management of athletic sports, its general effect was highly encouraging both to the faculty and to the undergraduates as to the moral and physical effects of athletics at Cambridge taken as a whole. It immediately brought about a better understanding between the faculty and the students on a subject of great interest, concerning which there has been much divergence of opinion. Some of the recommendations of the report have already been adopted, and others are likely to be. There are still many excesses and evils connected with athletic sports as intensified by intercollegiate competition ; but the faculty take comfort in the general physical improvement which they witness in the average student ; and they hold that dyspepsia is less tolerable than a stiffened knee or thumb, and that effeminacy and luxury are even worse evils than brutality."

In order that there might be a more harmonious working towards the end in view, the constitution of the committee on athletics was changed so as to comprise three undergraduates, and three graduates, together with three members of the college faculty. The committee as thus constituted have entire supervision and control of all athletic exercises within and without the precincts of the university, subject to the authority of the faculty. This plan has worked admirably at Harvard, and, although the new committee has done little more than to follow the lines laid down by the original committee, the regulations have been accepted with a better grace by the students and have been more generally lived up to.

Under the protecting influence of this committee, and in consequence of the efforts they have made to improve Harvard's facilities for the practice of athletics, this branch of physical training is now in a flourishing condition. We no longer reckon success by the number of championships held or the number of records broken, but by the number of men we can induce to take an active interest in the practice of some kind of athletic sport. How well we have succeeded in this respect may be judged from the following statement :—

Number of students at Harvard University who took part in training for the following sports in 1891:—

University crew,	20
Four class crews,	60
University foot ball,	96
Class foot ball,	135
Track and field athletics,	147
University base ball,	25
Four class nines,	95
Tennis (65 entries to tournament),	300
Cricket,	25
	903
Hare and hounds,	50
Shooting club (members),	85
Canoe club (members),	72
Bicycle club (members),	98
	1208

Concerning the policy and management of the various athletic teams there is with us considerable difference of opinion. Some claim that the athletic committee should dictate the policy and manage the ball nine, foot-ball team, etc., as long as they make their public appearances in the name of the university. Others claim that this function should fall upon the graduates. Perhaps the largest number believe that the students should manage their own games, etc. Personally I am not in favor of either plan. Athletic sports have grown so rapidly and developed so extensively during the past few years that it is now impossible for any one committee to keep thoroughly informed on all the details of all the sports, and, without a knowledge of these details, the committee would be incompetent to act as managers or advisers. And then in my opinion the very nature of these contests precludes any committee composed of faculty members, and appointed to regulate athletics, from assuming to manage the practical affairs of the different clubs and associations. On the other hand, few graduates can afford to give the time necessary, even if they have kept pace with the development of the subject.

If they have the time togive, the chances are that they have not the requisite knowledge, and that they will misuse their opportunity.

But experience has shown that the management of the different athletic organizations is too much for the students to assume without the counsel and advice of older heads. Moreover, it should be said that the sole responsibility for the practical working of a team through the entire season ought not to fall upon the captain alone, as is usually the case.

The crying need in our colleges to-day in connection with the management of athletics is the advice and instruction of experts. The whole subject has simply grown beyond the capacity of faculty, students, and graduates, and if athletics are to be pursued along the same line as other branches of education, *i. e.*, with a view of attaining the highest degree of excellency, institutions must employ special instructors trained for this service, just as they employ instructors skilled in the teaching of Greek, mathematics, chemistry, etc.

This is a conclusion which I for one would gladly escape, for it will add greatly to the difficulty and expense of keeping up an interest in athletics, especially in the smaller schools and colleges, and just what its influence will be upon the general cause of physical training is questionable. But it is one of the natural results of a failure to adopt the intercollegiate regulations, and I see no escape from it.

If the men appointed to these positions are so fortunate as to have a college education in addition to their training as experts in physical exercises, it will add greatly to their qualifications for college work. If they have the good sense, also, to work through the student officials, quietly instructing them as to their duties but keeping themselves in the background, and letting those who participate in the sports have the honor and glory of victory, this quality will be highly appreciated by the students, and render the position of the special instructors at least tenable in case of an overwhelming defeat.

The appointment of specialists in athletics will necessarily make the duties of a medical director more desirable, and more onerous, as he will have the enthusiasm and inclinations of the instructor to keep in check, as well as those of the students.

The grand idea of general excellence in several sports requiring different qualifications, and contributing to the harmonious development of the whole body, which is the highest aim of all advocates of physical training, and which the medical director must keep constantly in mind, will in the future be more difficult to put in practice unless concerted efforts are made in this direction. The move taken by the Y. M. C. A. in establishing the pentathlon, or the general excellence plan, in their athletic sports is highly to be commended and will partly make amends for their temerity in introducing competitive exercises, with their perplexing problems, into association work.

Returning again to the management of athletics, we are prepared to state that, inasmuch as these sports are maintained for health and physical improvement, the medical director must decide as to who is fitted to enter contests and who is not. He may also give advice as to the kind of sport that is likely to do the individual most good, and give personal talks or public lectures on the general subject of physiology and hygiene. Beyond this limit he cannot go unless he desires to become his own executioner.

The practical management of each sport should devolve upon a committee composed of a recent graduate deeply interested in the sport under consideration, the special instructor or coach, and the student captain of the organization. The committee should feel free to confer with the medical director, and the committee on the regulation of athletic sports, but the responsibility for the plan of campaign, or policy pursued, must rest with the committee of which the captain of the team is a member. This would seem to be the only way to harmonize the diversified interests that are now concentrated about this great subject, and to lessen the friction of what seems likely to be an inevitable conflict.

THE INFLUENCE OF HABITUAL POSTURE ON THE SYMMETRY AND HEALTH OF THE BODY.

BY ELIZA M. MOSHER, M.D., BROOKLYN, N. Y.

In connection with several educational institutions, and in the general practice of medicine, it has been the duty of the writer to make a careful physical examination of many hundred girls and women.

Early in this work I observed variations from the normal symmetry of the body.

Some of these variations were demonstrable by tape measure and calipers. Others, although obvious to the eye, were incapable of measurement. As these cases have multiplied, it has been possible to classify them and to discover, to some extent at least, the influences at work in their production.

It is the object of this paper to present some of the results of this study. The time allotted to it, however, will only permit a discussion of those changes in symmetry which are produced by long continued habit, best seen, therefore, in individuals at middle life, when, as Emerson says, "The tell-tale body is full of tongues. The wise man reads its private history in its looks, its gait, its behavior."

In order to present the subject clearly it will be necessary to briefly review the postures which the body naturally takes when in equilibrium, standing and sitting.

The human skeleton consists of two symmetrical halves, which exactly balance each other. It is clothed by muscles, which, when properly developed and equally used, give to it its shapeliness and grace. Unevenly developed, and unequally used, they have the power to distort and cripple the whole structure.

In the standing posture the pelvis (which is practically one solid bone) becomes the pivotal region of the trunk; upon its position the symmetry of the body depends. Balanced equally upon the legs, the crests of the ilia occupy a horizontal place, and move upon an axis which passes vertically through the center of the sacrum.

The spinal column, with its weight of arms and head, rests upon the pelvis, with the arms hanging at the sides, and the head erect, the lateral portions of the body balance each other, so that a line drawn through the spines of the scapulæ is parallel with that drawn transversely through the pelvis, and the axial line of the pelvis prolonged upward traverses the center of the trunk and head.

Remove either foot from the floor, and the leg, instead of a support, becomes a weight attached to the pelvis. To maintain its equilibrium upon one foot the body must shift some other weight to the opposite side of the median line, to balance the weight of the unsupported or partially supported leg.

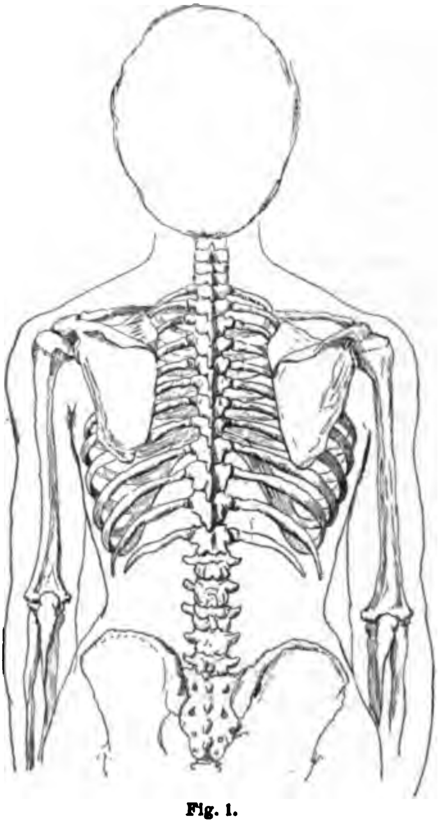

Fig. 1.

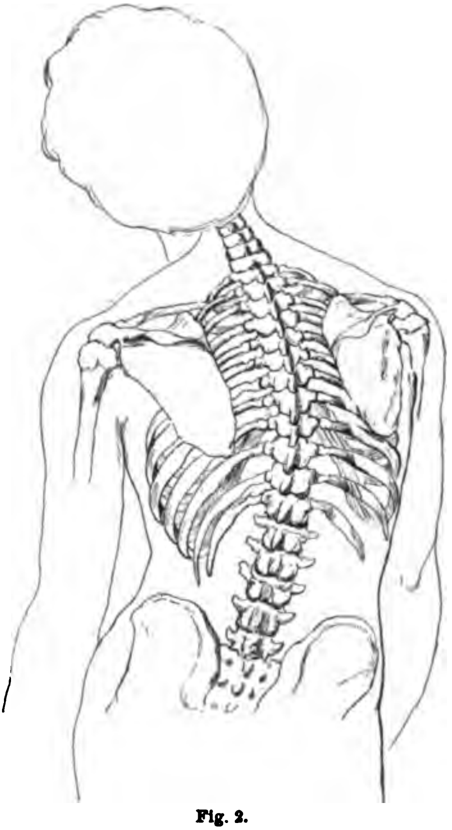

Fig. 2.

The head and shoulders are used as *counter* weights. If the unsupported leg is thrown forward, they drop backward, and *vice versa.* If it is abducted, they fall to the opposite side. In this process of equilibriation the spinal column plays a most active part; made up as it is of movable segments, it permits this process of shifting the weights, by curving upon itself; shortening upon one side and lengthening upon the other; at the same time rotating, if necessary, upon its axis.

The ribs, articulating as they do with the spinal vertebræ, participate in its movements, becoming approximated upon the concave side of its curve and separated upon its convexity. The scapulæ being attached to it only by muscles, move with the arms and head, independent somewhat of the movements of the spine. They possess, by virtue of their attachment, however, a powerful leverage upon the dorsal region of the spine.

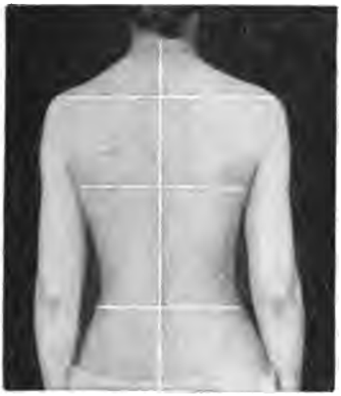

Fig. 3.

In the sitting posture the weight of the lower extremities, as a modifier of posture, is removed. The pelvis becomes fixed in a position which obtained when it rested equally upon both legs.

The lumbar vertebræ now become the pivot upon which the trunk moves. The "balance of power" is vested in the arms, which hang like weights upon the base of an inverted cone; suspended at the sides upon the hip line, they balance each other, permitting the spinal column to poise itself upon the pelvis, and the head to rest upon the spine. This attitude is maintained with comparatively small expenditure of muscular force. Remove the weight of one arm (by supporting the elbow), and the trunk finds its resting place with the weighted shoulder depressed, and the head thrown towards the opposite shoulder. Swing both arms in front of the hips, and the normal antero-posterior curve in the upper spine increases, while the head drops slightly backward, projecting the chin forward,—at the same time the scapulæ are drawn apart.

Suspend the arms behind the hips, and the upper spinal curve straightens, while the normal corresponding curve in the lower dorsal region increases. Support both elbows, and the shoulders approach the head, not only by removal of their weight, but by the sinking of the trunk downward, by the force of gravitation.

The posture of the head, owing to the intervention of the mobile cervical vertebræ, does not in itself greatly modify the posture of the trunk, whereas, as has been shown, the position of the lower extremities and movements of the trunk have much to do with the posture of the head. By this brief review it is evident that gravitation (so called) is the great controlling force of the body at rest, and that its work is beneficent, tending to take the place of muscular activity as far as possible, in the maintenance of the upright posture both in standing and sitting. The weights are shifted by muscular movement, and, when equally placed, "gravic force" aids the muscles in maintaining them in position.

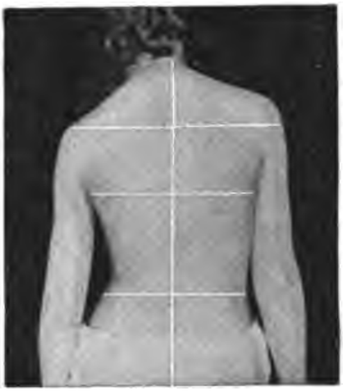
Fig. 4.

Having reviewed the posture which the body assumes with its supports and weights variously adjusted, we are now prepared to consider the influence upon the shape of the body, of permitting it to fall habitually into one of these natural postures.

The will presides over the activity of the skeletal muscles, but it has so much besides with which to occupy its attention, that it permits them to do their work more or less automatically; and it happens sooner or later, in the life of the individual, that certain groups of muscles take upon themselves the larger part of the work of maintaining the body in the standing or sitting posture. Very trivial causes may decide the choice which is to affect the symmetry if not the health of the body. More often, however, *enforced* attitudes, as those of the schoolroom and the workshop, produce this result. In whatever way acquired, the influence upon the shape of the body is potent for good or evil.

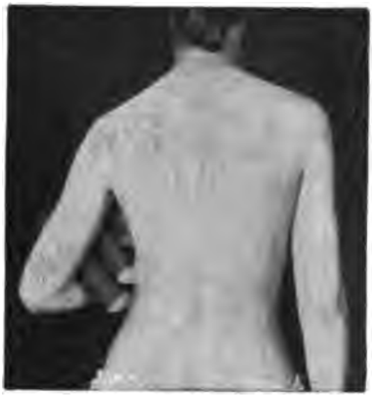

Fig. 5.

I have already spoken of the three fundamental postures which the body assumes in standing, viz.:—

1. With both extremities evenly placed beneath the pelvis.
2. With one leg thrown forward, as in the attitude of walking.
3. With one leg in abduction.

The influence of the first as a favorite posture would be to maintain the symmetry of the body, as by it all its parts are evenly placed. But experience shows that this position cannot long be maintained. Through fatigue, one support or the other drops out from under the weight, whereupon the posture changes to the third of the series.

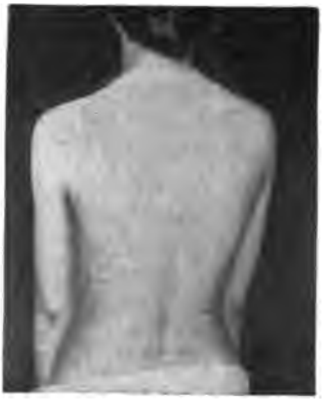

Fig. 6.

The second position, viz.: With one leg in advance of the other, as in walking, permits the body to rest upon one extremity with very slight reduction of the normal spinal curves. The bones of the skeleton are all so placed in this posture as to retain the muscles in normal and symmetrical relations, as regards the distance between their origin and insertion,—the direction of their fibers, etc. The balancing of the head and shoulders to antagonize the weight of the forward leg, calls into action the muscles of the cervico-occipital region, while those upon the anterior aspect are placed in an equal degree of extension. The influence of this is to fix the scapulæ and upper ribs in a position favorable to the best action of the respiratory muscles; hence the posture is conducive to chest expansion. The head cannot drop to either side without disturbing the equilibrium of the body, and the soft tissues of the face, which are apt to become distorted by unequal muscular movement and gravitation, retain their symmetry under the influence of this position, even though it become habitual. The internal organs swing evenly upon their supports, presenting thereby no impediment to the blood current, an element more important, perhaps, to the health of women than to men. The ease with which the weight of the body can be lifted from one extremity to the other, not only makes this a posture which can be retained a long time without undue fatigue, but renders it favorable to the making of gestures, and the use of the voice. Hence it naturally becomes the favorite posture of the orator and the public singer.

Because of the narrow base which it gives to the body, however, and the corresponding sense of insecurity which the individual unaccustomed to it feels, this is not the posture naturally chosen. In standing with a stable foundation beneath the feet, and a little training, it becomes easy to assume it, and it is always healthful.

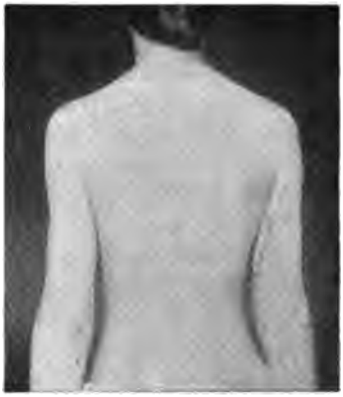

Fig. 7.

The third fundamental posture of the body in standing is the one most commonly chosen as the habitual one; doubtless because of the broader base which it gives, when needed, for the support of the trunk. The change from the walking posture to this, too, is so radical that it gives a sense of rest most grateful to the tired tissues.

The best way to make a critical study of this position with reference to its healthful tendencies or otherwise, is to examine an individual whose occupation has for several years necessitated the standing posture, and who has acquired the habit of dropping upon one and the same leg.

Understanding symmetry to mean exact accordance of the two halves of one body, we place our patient evenly upon two feet and compare the two sides. We find in most cases the following variations more or less well marked, according to the general health of the individual and the length of time the posture has been habitual. (In robust persons the muscles and soft tissues are not moulded by postures as readily as in the poorly nourished and overworked.)

If the left extremity has been the favorite one (as it is in a large number of cases) the left thigh and leg will measure a little more than its fellow. The left hip is higher than the right, and the spinal column is slightly curved, presenting its concavity toward the supported side. In exaggerated cases, and when the right arm has been much used, a compensatory curve is found in the upper dorsal region, the concavity of which presents in the opposite direction. In all cases there is marked projection of the angles of the ribs upon the unsupported side, indicating more or less rotation of the bodies of the spinal vertebræ toward the right. The ribs upon the left side approach each other and the crest of the ilium,—shortening in a very marked manner the body line upon that side. The spaces between the ribs on the right side are proportionately widened, and the lengthened body line lacks the curve presented by the opposite side. The left shoulder is lower than the right, and the left hand accordingly reaches a lower point upon the thigh than does its fellow.

The shoulder lines are unsymmetrical, and the vertex drops toward the left shoulder, while the chin points toward the opposite side. There is marked loss of symmetry in the two sides of the face, due to gravitation and unequal muscular activity. Unmodified by defects of sight or hearing, and by a variation of the length of the extremities, the lines of the face always manifest the same deviations from the normal in all cases where this posture has become habitual.

With the head tipped to the left side, the angle of the jaw becomes the lowest portion of the face, hence, the soft tissues of the cheeks gravitate in that direction, producing a rounded contour on the left side in contrast with the flattened outline of the other side.

The angle of the mouth usually drops a little upon the downward side; sometimes, however, it becomes elevated instead. The median line of the nose frequently inclines to the left as it approaches the lip, and the ala is drawn upward by its levator muscle, shortening the distance between the angle of the nose and the eye, as compared with the corresponding line on the opposite side.

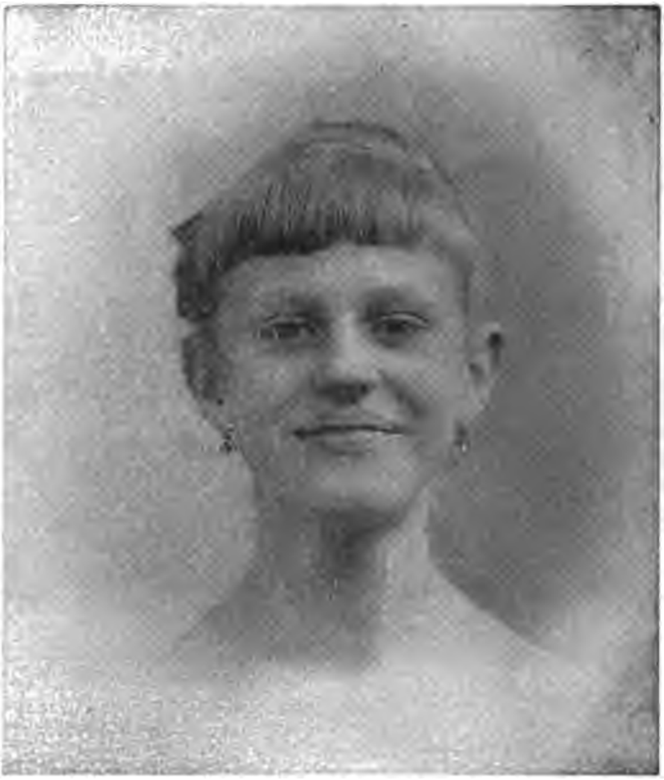

Fig 8.

The left nostril is dilated and more movable than the right. The septum narium being drawn toward that side below, tends to project in the opposite direction above, thus occluding to some extent its cavity in the region of the middle turbinated bone. The cheek fold becomes more or less erased on the left (by gravitation of tissue outward), while on the right the same force deepens and elongates it. The left lower lid is pulled slightly downward and outward, increasing the breadth of the opening at the outer canthus. The same tractile force applied to the right eye from the nasal side lengthens or seems to lengthen the opening, at the same time widening the space at the inner canthus; hence the left eye becomes oval and the right linear, in well marked cases.

The facial muscles, owing to their insertion into the soft tissue of the cheek and into each other, participate in the changed relation of parts. Because of greater freedom of movement upon the left side, the muscles become more mobile than those upon the flattened side. As a result of this they retain their tone, becoming, perhaps, in some cases slightly hypertrophied, while those of the opposite cheek, through disuse, approach the condition which obtains in paraplegia facialis. Lack of symmetry in the two halves of the face has long been observed by artists and photographers, but the casual observer seldom takes note of it until his attention is called especially to the subject.

These changes in the face which I have here pointed out are all produced by carrying the head on the same side, whatever the cause. Most often, however, it occurs as a result of standing and sitting with the trunk tilted to one side. When produced by defective vision, the face-lines differ from those described, according to the angle at which the best refraction is obtained.

It will readily be seen that it is important for the general physician, as well as the specialist, to recognize the significance of facial asymmetry, in order to utilize it as an aid to diagnosis, as well as to enable him to remedy faulty habits of posture, which in time are sure to distort the features.

The neck muscles tell the story of habitual posture more loudly, if possible, than do the lines of the face. Those which are attached to the occipital ridge and basilar process participate most markedly in the changes observed elsewhere.

The sterno-cleido-mastoid and trapezius muscles become tense, and limit the bending of the head toward the high shoulder in these cases, so that inspection of these alone

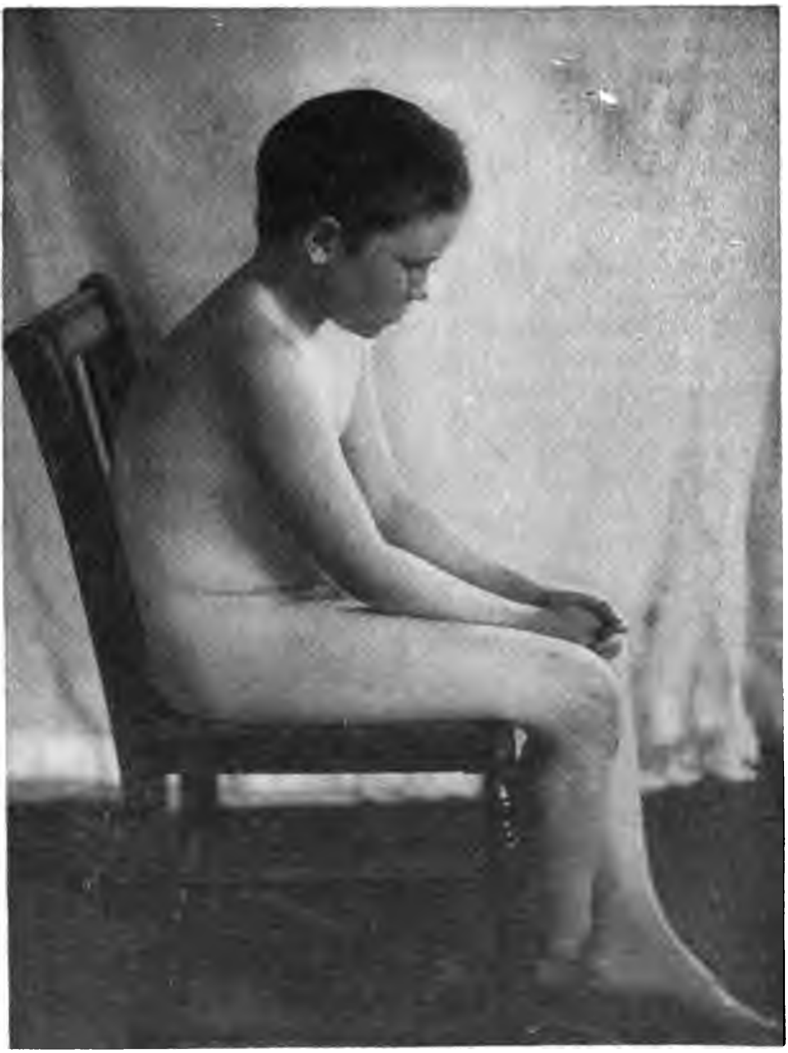

Fig. 9.

betrays the habitual posture of the body.

The muscles which rotate the face toward the right shoulder, viz.: the left complexus, rectus capitis posticus minor and superior oblique, obtain a greater degree of development than their fellow, hence the greater fullness of the neck, which may be observed upon the left side posteriorly. This fact may, in some cases, account for the fatigue and pain in this region, complained of so frequently by patients who are overworked.

If the head does not incline toward the left shoulder in an individual who habitually rests on the left leg in the posture described, and there is no defect of vision or hearing, it is safe to conclude that the right leg is short, in which case the head is not needed as ballast. Indeed, if there is a marked difference in the length of the extremities, the weight of the head is transferred to the side of the short leg, in order to balance the body.

The low shoulder and shortened body-line are still found upon the supported side.

The external *skeletal* muscles are not the only ones involved in this process of change. The extra ocular groups are, to say the least, placed at a disadvantage in the sidewise posture of the head. The obliques especially are forced to do more than their share of the work of rotation of the eyeball. No observations have as yet been made which demonstrate special abnormal conditions thus produced, but it is not unreasonable to include this posture among the causes of incoördination of the extra ocular muscles.

That the septum narium is deflected by it more or less, there is no doubt. The prevalence of this habit of posture, and the large number of cases of nasal disease produced by deflection of the septum, render the presumption that the two are related to some extent, as cause and effect, a safe one.

The pharyngeal muscles participate almost invariably in the general loss of symmetry. Taking origin, as they do, from the base of the skull, they are so placed in sidewise postures of the head as to work with origin and insertion approximated on the left, while the opposite condition prevails upon the right side.

Upon observation of these cases I have found the uvula, if small and relaxed, deflected toward the right, or upper side of the head, whereas, when it was large and muscular it most often had its tip drawn toward the left, on which side the palatal arches are high and firm, as compared with the stretched and drooping ones upon the opposite side. (It is sometimes necessary to hold the mouth open a moment to tire the throat muscles in order to determine this habit.) What influence, if any, upon the health of the pharynx this unequal activity may have, has not been determined, so far as I know. It is an interesting fact, however, that in the shape of the interior of the nose and throat we may find an intimation in reference to the habitual posture of the individual.

In a large number of the cases studied, there was a demonstrable increase in the size of the chest upon the supported side. This is probably due to several causes, mainly, however, to the position of the scapula, which has its posterior border approximated to the spinal column. Fixed in this attitude by the rhomboidei muscles, it places not only the serratus magnus but other respiratory muscles in the best possible attitude for contraction; whereas the opposite condition obtains upon the right side. Here the scapula recedes from the spine, and has its posterior border everted. The rhomboidei are stretched and weakened, and the normal direction of the fibers of the serratus magnus is changed.

The rotation of the bodies of the spinal vertebræ to the right interferes also to some extent with the movement of the ribs. It is evident that these influences are capable of diminishing the capacity of the chest on that side. How much such a variation predisposes to disease, it would be unwise to premise, in the absence of conclusive evidence. It is certain, however, that the diagnostician should be familiar with this variation and its cause.

Shortening of the abdominal wall on the supported side, by the approximation of the ribs and ilium, tends to displace the intestines downward and toward the opposite side. The effect of this upon the already relaxed and lengthened abdominal wall may predispose to the production of hernia.

The pelvic organs of women undergo, doubtless, more positive injury from the habitual indulgence in this posture than do any others in the body. The pressure of the displaced intestines downward and towards the unsupported side becomes a force sufficient to crowd the more movable organs in the pelvic cavity towards the wall upon the unsupported side. Held in this posture many hours a day their supports become shortened on that side, lengthened correspondingly on the other. The vessels in the crowded tissue become tortuous under this influence, predisposing to congestion. With this condition established, slight causes produce disease, which is hard to combat so long as the faulty posture remains habitual.

I do not know the microscopic condition of muscles which have become shortened by habitual approximation of their extremities, nor of those which have undergone continuous stretching. The gross effect upon the former is to increase their size, at the same time lessening their elasticity; while the latter become attenuated under the slow lengthening process. Neither condition tends to increase their usefulness; on the contrary, the tendency is in the direction of weakness and premature loss of power.

Every occupation presents temptations to the body to acquire a habit of posture which in time modifies the shape of the individual.

The schoolgirl who habitually sits with one elbow supported and head to the opposite side, is likely to acquire the body shape which I have described in connection with a right or left abducted leg. The carrying of her books upon the left arm, as is the habit of girls, tends to modify or increase the lateral curvature produced by sitting and standing.

The woman who sews by hand acquires a low right shoulder; while the one who habitually uses a machine, upon which both arms rest, tends to become high shouldered, with symmetrical body lines.

The man who stands at a desk with arms supported, in time assumes the same shape.

The sailor who climbs the masts acquires a similar shape, although in a different way.

The man of letters, working with head forward and chin depressed, elongates his cervico-occipital muscles, so that at middle life we recognize him without difficulty.

The drug and dry goods clerk, if right handed, works with left foot thrown to the side, and body to the right; both arms in front of the hip line. The resultant shape we are all familiar with, if at all observant.

The horse car driver, as he stands with his right hand on the brake and left on the dash board, acquires a left foot twist in accordance with this posture.

The truck driver who sits with arms forward holding his reins is a characteristic figure.

The man who digs the street, the bricklayer, and the hod-carrier, all assume in time their own trade-mark.

So general is the tendency to acquire habits of posture, we must accept it as a law of life. What influence it shall have upon the symmetry and health of the body depends upon the posture.

Those postures which limit chest expansion, which curve the spine abnormally, which displace the viscera, and distort the features, cannot be otherwise than harmful in themselves, although the body is long-suffering, and if allowed sufficient time adapts itself as far as possible to unhealthful conditions.

To recapitulate. There are three fundamental postures in which the body in the upright equilibriates. A certain amount of muscular force is required to retain it in any of these positions. The first posture is not practicable as an habitual one, because it does not admit of alternation in the use of the lower extremities. The second places the body in the most symmetrical attitude it can take, and at the same time permit the alternate use of its supports. This is a posture not naturally chosen, but easily acquired by training. The third, which is the favorite posture of mankind, is harmful in its tendencies, both as regards its influence upon the symmetry of the body and the economic and healthful use of its complex machinery. Its adoption, then, should be deprecated, and especially so in our schools and stores.

The shape of the body in the sitting posture is greatly dependent upon the position of the arms and head. The one which best maintains the symmetry of the trunk, and therefore is healthful, is that in which the spinal column balances upon the pelvis, with the arms at the sides, and the head upright. This posture is the one which the body should be trained to assume in the schoolroom, the workshop, and the carriage.

DISCUSSION.

DR. JAY W. SEAVER, Yale University : Anthropometrical measurements may be classified in two distinct lines ; first, those which are purely mechanical and can be done by any one. I refer to the taking of measurements and the getting of records. This is a purely mechanical process. Any worker who has patience to be accurate, can secure results the same as the man of the best education and equipment for this work of physical education in other respects. There is, however, another field, and that is the one that has been presented by Dr. Mosher, Professor Demeny, and Dr. Enebuske, the artistic side, and that part cannot be enlarged upon too much. I think it was a surprise to many of you who have been working in this field of anthropometry several years to know that it is possible to discover the asymmetry of a person's face by passing your hand down the back ! But we should have the æsthetic sense so cultivated that the eye can tell more of the physical condition, as to symmetry and health, than we can derive from the tape and calipers. That is the perfection of our art, when by looking at our subject and taking in every item that we should take in with our eyes, we should be able, by the use of our judgment, to tell what the needs of that person are, what the possibilities of the person are for development, and the exercises that will most likely tend to give that development.

It has been my fortune to work in the field of mechanical anthropometry to some extent, and I have devised some little instruments for simplifying the work. Many of you who are young in this field have been deterred from making complete measurements because you say, Here is a list of fifty measurements and a great many are of no practical importance and I will not spend time taking them. The more complicated you make things the more sources of error there are, so I plead for simplicity. Do your work with the simplest instruments that can be found and you will get more accurate results and you will also have a wonderful saving of time.

As to the time necessary to make these fifty measurements, any person with some experience and good eyesight can take them in four minutes and take them as accurately as by spending a half hour upon them. That being the case the list is not a formidable one.

In regard to securing the measurements I wish to present two matters before you, and the first one is a simpler means of taking heights and breadths. There is a saving of much time in using this instrument and you have the advantage of taking the measurement in a natural position. If a person stands up against the wall his position is strained and is not a natural one. For recording spinal curvatures I wish to show you another instrument.

(Dr. Seaver then exhibited and explained his two instruments.)

DR. E. HITCHCOCK, Amherst College: I wish I could talk a good while about Dr. Mosher's paper. I conceive it to be one of the most important things brought before this Association for a long time. We must turn to the laws of beauty. Beauty is about us in the admirable execution of this beautiful building. We must attend to it more in the human form. And it is very appropriate that this subject should be brought to us by a woman and that it should be brought up by a doctor and a member of the A. A. A. P. E.

Foot-ball is mighty popular with us and the ball gets kicked up pretty high. We old fellows who go in for averages and means get some pretty serious kicks and are willing to take them. But the foot-ball always comes back. The plea is that we don't want the averages. Yet we have to come back and say, How big is the man ? How much does he weigh ? We have got to find these things out to get the per cent. We have got to have something to work from. I have been in the work of getting averages and means for a long time. I am constantly at work in examining averages and means. We take these items as a standard to work from. We work away upon the system that the Association has agreed upon and I am going to follow it right along until I go. I took one class of seniors who were freshmen four years ago, and put side by side their measurements as freshmen and as seniors. I have arranged these in groups representing essentially structure and func-

tion. Now what increase do I find in these eighty men? Increase in bone structure, 1.31 per cent.; in muscular size, 4.47 per cent.; vital organs, 4.51 per cent.; in bodily weight, 7.42; in muscular power, 24.90.

I will not give you details. I have the whole thing here in print. Put the sheets in your pockets and carry them home.

(Pamphlets and a sheet with tables were then distributed.)

Miss M. Anna Wood of Wellesley College then presented to the Association an anthropometric table compiled from the statistics of Wellesley College, representing 1,500 girls. The statistics were arranged according to Galton's method. She also wished to call attention to the fact that the statistics of Wellesley girls used by Dr. Enebuske were of students who had had no previous physical training. She said that outdoor sports were to be introduced at Wellesley; that there were going to be four freshmen boat crews for whom the boats were now building, and she invited anyone interested to come out to the college and see the outdoor work that the students were doing.

DR. MARY TAYLOR BISSELL of New York: The investigations that I have made seem to corroborate Dr. Mosher's statements. But there are other conditions which may be the cause of asymmetry. The condition of rickets is one great cause, and this, I have reason to believe, is becoming more prevalent in America. Young children of six or seven often show one-sidedness in the thoracic region and other twists which cannot be attributed to posture. The claim that the arm of the mother in carrying the child sometimes produces curvature is hardly tenable, for a great many children who have curvature have not had this mother's care. Another fact is that some are born asymmetrical, with deviations of the eyes and differences in legs, etc., which would account for some of these asymmetries. But with all these considerations cast aside, too much stress cannot be laid on the hygiene of young children and on the necessity for physical education. Those whom I examine, who have a great deal of lateral curvature, I always ask, Do you go to school? "Yes." Take a seat, I say, and show me how you sit at school. Almost invariably they sit on one buttock and rest one arm on the desk with the head tilted to one side. The bad influence of that has been recognized. At a recent meeting of the Council of Hygiene in London, a distinguished gentleman proposed a public movement with reference to the chirography of the English girls, as it was believed their attitude in writing was the cause of lateral curvature. The great amount of writing now required in the schools, the influence of the position on the plastic organization, with the long hours and short recesses, combine to produce lateral curvature. The Germans and French have pointed out the necessity for a chair and desk which should be assigned to each child, that should be exactly adapted to the size of the individual child, and they have given exact statistics of the sizes needed. Proper chairs and desks and proper posture when writing will go far toward reducing this tendency to asymmetry.

THE BEST SYSTEM OF GYMNASTICS FOR USE IN AMERICAN SCHOOLS.

MISS GULLI OBERG.

The necessity of physical education for the rising generation begins nowadays to be realized in every country, and every man or woman who takes an interest in educational matters cannot deny the importance of it. Mind and body are, as we know, intimately connected with each other, and nobody can develop one of them and neglect the other without sooner or later suffering the consequences. A sound method of education is therefore that one which aims at a right proportion between the mental and physical development. The main object of all systems of physical education ought to be an earnest endeavor to make the body a good and worthy dwelling for the mental and moral faculties as well as an obedient and harmonious instrument directed by a reasonable will.

The way to carry out this object is to use the resources which the body itself provides, namely, muscles and bones, or levers on which the muscles act to produce movements.

But which is the best way to proceed to choose among all the possibilities of motion within the power of the body? I think that my countrymen can, without boasting, say that among all systems heretofore known, the Swedish system has come nearest to the desired object. In examining the elements of the Ling system we find that its main purpose is to create health, further to maintain or preserve this result once secured and to harmoniously develop the physique within the limits of reasonable possibilities. Nothing unnecessary or irrational is suffered, and we do not believe in practicing every movement that is possible for the body to execute. A person can,for instance, with a little training learn to perform all sorts of astonishing exercises on a horizontal bar, as hanging by the toes, neck, or on the back, etc., but this does not indicate that these movements are useful. As Ling very strikingly says: "One ought not to eat everything one is able to swallow!" The essential need of the body was, therefore, the first matter he considered in selecting movements. After long and careful study of anatomy, physiology, and mechanics of motion, and even by experiments made on dead bodies, he learned to know the physiological effect of every muscular motion on the whole physique, and he arranged the movements according to their different effects upon the body in certain large groups; one exercise taken from each one of these principal groups and put together form what we call a gymnastic whole, or a daily order, intending to act harmoniously upon all the different organs so as to make their functions work in a right proportion, one to the other; no organ must be developed at the expense of the other. The respiratory organs and the heart are considered of the greatest importance. They form the basis for all the gymnastic operations,and all effort is directed to the increase of respiratory activity and of oxidation.

In order to obtain the desired result, we have to consider another point, which is almost as important as the forming of a daily order, that is, the right execution of the exercises. The proper duration, the planes in which the movements must take place, and the rhythm of each one are therefore carefully described, and should any one of these points fail to be observed a different or even an opposite effect would follow than the one aimed at. A useful exercise can, when exaggerated, become injurious, and this is done either by immoderation in speed or in duration. The respiration and the heart-beat are the natural regulators which we have to consult. An exercise carelessly performed in a negligent position cannot have the designed effect even if the muscular effort is just as great as if done in the prescribed way. Of great importance is therefore the position in which the exercises take place, the right carriage of the arms, shoulders, and head.

The next point we come to with regard to the execution of the movements is the progression which is made in the exercises themselves in a daily order, and also from one daily order to another. This way of proceeding develops the physique gradually and prevents all overexertion. We can designate progression in a daily order with a curve. The exercises in the beginning of it are very easy and then gradually increase until the middle, after which they again decrease to light and calming movements in order to cool off the body and bring the pulse and the respiration into normal function again. The same procedure is observed in the performance of each exercise by itself, the greatest muscular effort being at the middle of it.

These few arguments are enough to prove that the Ling system stands on a true and rational basis. Let us now for a few moments dwell upon its pedagogical application, and we shall surely find that it would make a great and valuable factor in any system of education.

The disciplinary character of the system and the way in which the exercises are carried out, following immediately upon the command of a leader, is designed to favor to the greatest extent the reciprocal activity between the cerebral and muscular functions, but this reacts upon the mind again, producing as a remote effect quick apprehension, greater readiness to obey, and a cheerful and vivacious manner. Much importance is, therefore, attached to the personality of a gymnastic teacher. He must be an *educator* as well as an *instructor*. He must be interested in his work and have an invigorating disposition in order to communicate this to his pupils. While I am speaking of this, it comes to my mind that I have heard the Swedish system spoken of as being tiresome just on account of its disciplinary character. I can only answer this objection by saying that there always are some individuals to whom every restriction or rule is disagreeable, and, moreover, there are others to whom all sorts of bodily exercises seem hateful, but I think that these unfortunate beings who do not understand their own good do not amount to a considerable number. Besides this, *physical education* is *not* meant to be a frolic, but a task just as important as any other part of education. However, if the teacher is an intelligent and capable person, the exercises may easily be made to form an interesting and invigorating play, founded upon an earnest basis.

From the very first the pupils are made to understand that each one exercises for his own good and not for the sake of being compared with others. Our gymnastics exist for the weak as well as the strong, hence every individual can be provided for. A right arrangement of a class is, therefore, to divide it into different parts according to the strength and ableness of the pupils, and with this in mind to give to each division a proper quantity and quality of work. We do not believe in ostentatious exhibitions where a few selected pupils are brought out in order to surpass others by showing off some bragging numbers before a crowd of applauding spectators. Gymnastic exercise is always with us a *means* to an *end.*

We will now for a few minutes consider the practical side of the system. We find then, that we, in using it, are able to profit by whatever conditions there may be: in other words, we are not confined to a certain apparatus. A daily order can be accomplished on a bare floor as well as in a purposely fitted up gymnasium, or even the desks and chairs of a schoolroom may be successfully used, but very naturally the object is more easily reached and a better result achieved when suitable apparatus can be had.

Another good point is that large numbers of pupils can be accommodated at the same time in a gymnasium even with small resources and without neglecting the need of each individual. This is done as I have already mentioned by arranging the pupils in subdivisions, and, further, to train sub-leaders among them.

I have now tried to the best of my ability to show you the superiority of the Swedish system as an educational system, and the following discussion will prove if I have failed or succeeded. But before I stop I would add : If some one asked me to make a distinction between the Ling system and other systems, I would say that these latter are very apt to neglect the end for the means, in other words, their ambition is to produce a certain bodily ability, to be able to do a certain thing on or with a certain apparatus. The common opinion is that the principal difference between our system and other systems exists in the movements. Some time ago I read in a newspaper an advertisement by a gymnastic teacher, saying that he or she, whichever it was, had chosen the best exercises from the Swedish system and was going to use .them with others from other systems. A brilliant idea indeed ! We have not any *best* exercises, their usefulness, or, if I may say *bestness*, is of course relative and depends on the need of the individual, and even, as I have already said, on the way they are executed. Besides this, nobody can pick out one or several of the Swedish movements and use them with benefit, without knowing anything about the principal idea and the conditions for their execution. That would be just as useless as to try to make a band of pearls without any string !

No, the superiority of our system is just the axiom on which Ling built his method: "To make the body as perfect a basis as possible for the intellectual activities." This idea, however, was not original with Ling himself, but his honor it is to have made it real by forming it into a gymnastic system based upon a physiological mechanical ground and made accessible to all individuals.

Mr. W. A. Stecher, of the technical committee of the North American Turner-Bund, then presented the following paper :—

THE GERMAN SYSTEM OF PHYSICAL EDUCATION.

Mr. President, Ladies, and Gentlemen :

America is gradually awakening to the fact that education in its highest acceptance is more than the mere training of the mental faculties, yes, that the development and education of the body is of primary importance, because it enables us to bring the mind to its highest state of excellence.

With this awakening there comes also the desire to possess a means of physical training that will answer all the requirements of our school systems, and which is adapted to the needs and peculiarities of our own country. The result is that a number of systems of physical training are offered to the public. Of all offered, but two deserve the name of a system, namely, the Swedish and the German. The others either do not offer enough for all the conditions of our schools, or are but poor apologies for a system of physical development, or, lastly, are poor imitations of parts of the German system.

A few cities in the East having adopted the Swedish or Ling system during the last years, this system has suddenly gained a prominence that seems astonishing to a body of men whose life work it has been to give to their scholars, in the form of gymnastics, the very best results that have been attained by a body of thousands of experienced and enthusiastic teachers, mainly in Germany, but also in all other civilized countries of the world. It seems strange to them that a conflict that was fought to a finish some thirty years ago to establish the precedence of the Swedish or German systems, and in which the most prominent men of the time, many of whom are still living and who have a world-wide reputation, took an active part, should again be resumed here in America. The conflict lasted a number of years, and a short account of the same and the statements of the most prominent combatants will greatly help us to see our way more clearly, and aid in choosing a system that will be of the greatest use to us.

The beginnings of German gymnastics are the result of much earnest thought and work of the best educators of the latter part of the last century. The first attempt to introduce into a school something that answered to our idea of physical training was made by Johann Bernhard Basedow, who in the year 1774, after traveling extensively all over Europe, in his school at Dessau, called the "Philantropin," introduced such forms of bodily exercises as swimming,ball games, bowling, riding, marching, dancing, running, besides carpentry and wood turning. He strove to carry Rousseau's views into effect, namely, "to manage it so that the training of the mind and body shall serve to assist each other." He tried to strengthen the body so that it could better carry out the dictates of the will.

At Schneffenthal, near Gotha, Salzmann, a former teacher at the "Philantropin," in the year 1784 enlarged upon the exercises brought from his former position.

It was Johann F. C. Guts-muths, a teacher at Schneffenthal, who, in 1785, became teacher of gymnastics there, and who first arranged the exercises there used into the beginning of our present system. "All that I found out from ancient usages," says he, "from the historical remains of earlier and later antiquity, all that reflection and sometimes chance offered to me, was brought forward for the sake of amusing experiments. Thus the chief exercises increased, and thus, after experimenting seven years, originated the first edition of my 'Gymnastics for the Young' (1793), my first attempt to call attention to a subject that had been quite forgotten." This was the first manual of gymnastics published in modern times.

Guts-muths says of "Gymnastik" that "it is work in the garb of youthful pleasure and merriment," and later on he again defines it as "a system of exercises having bodily perfection for their aim."

Let me here state that the German system of to-day is based upon a wise mingling of both quotations.

In 1795 Anton Vieth, of Dessau, published his "Encyclopedia of Bodily Exercises." In 1799, Nachtegall, a follower of Guts-muths, established a private gymnasium in Copenhagen, and it was here that Ling, the founder of Swedish gymnastics, had his first lesson in gymnastics. During this time Ling also learned the art of fencing from a few French refugees.

Gymnastics, however, made no rapid strides for universal recognition in Germany until the time of Jahn. Friedrich Ludwig Jahn, Ph.D., son of a preacher, born in Lanz in 1778, first made gymnastics popular. After attending various universities, in 1809 he became a teacher at Berlin in the "Gymnasium zum grauen Kloster." In 1811 we find him as the leader of many patriotic young men, opening the first outdoor gymnasium on the Hasenhaide, then just outside of Berlin. It was here that in connection with strengthening their bodies he, by his speech and writings, inflamed the hearts of his scholars to the highest patriotism. Thanks to the spirit emanating from him, gymnastic societies—Turnvereins—sprung up all over Germany. In connection with Eiselin, Friesen, and many other devoted followers, he arranged his system of gymnastics and published it in 1816 under the name of "Turnkunst" —"The Art of Gymnastics."

From now on, bodily exercises were gradually introduced into the schools and into the German army. Gymnastics for the schools, however, did not receive the form it has at present until the founder of modern school gymnastics, Adolf Spiess, in the year 1840 published his "Gymnastics" in Burgdorf, and in 1846 his "Manual for Schools." He emphatically demanded that gymnastics as a whole—not only calisthenics—should form an integral part of the curriculum of every school. At the same time he was the first to show how this could be done by substituting class-work under the personal direction of the teacher, in place of the squad work under leaders.

During this time we find the Ling system of gymnastics progressing also. The movements that he used in his system were first practiced in Stockholm in 1813 "as a remedy for certain diseases." In 1815 the Royal Gymnastic Institute was founded at Stockholm and remained under Ling's supervision until the time of his death in 1839. This institute distinguished between medical and educational gymnastics. After his death Ling's system was developed according to the directions he gave while on his deathbed. The claim made for his system is that "he never introduced a movement the physiological effects of which he could not demonstrate, and in his selection of exercises those which did not exactly produce the effect he desired were discarded, however classical or beautiful in appearance, in favor of such movements as he found to be absolutely essential in producing a harmonious development of the body."

In the year 1848, Major Rothstein, a scholar of Ling, succeeded H. F. Massmann as director of the Royal Central Gymnasium of Berlin, a normal school under the direction of the Prussian government, for educating teachers of gymnastics for the schools and the army. Rothstein introduced Swedish gymnastics and published a periodical, *The Atheneum*, in the interest of the same. In the course of his work he attacked the German system and especially its use of the parallel bars, the latter, he claimed, being positively injurious as a gymnastic apparatus according to the views and teachings of the Ling system. He had the bars, not only the parallel but also the horizontal, abolished from his institute. This created quite a discussion, and the authorities of Prussia installed a commission of two physicians to report upon the question at issue. This commission reported in favor of the abolishment, and the result was a conflict which lasted for years, during which gymnastics were brought into the foreground as never before since the time of the Greeks. All the noted anatomists and physiologists of Germany took an active part. Standing foremost in the fight was Professor Du Bois Raymond, Professor of Physiology of the Berlin University, who to-day stands among the highest authorities in his line. He not only inquired into the advisability of keeping the parallel bars in a gymnasium, but at the same time made a study of the claims of the Swedish system. The time is too short to quote from other essays of his or his contemporaries. I therefore use parts only of his essay, "About exercises on the parallel bars and the so-called rational gymnastics." Berlin: Georg Reimer, 1862.

"*The point to be ascertained,*" says he, "*is: Does exercising a single muscle or a group of muscles bring about a quick and sure or even a desired degree of physical development?*" (The term "*physical development*" is here used in opposition to "*muscular development.*")

With the negation of the above, the whole system of Swedish gymnastics falls to the ground. Answering the question in the affirmative would necessitate a comparison between the two systems as to which is the better. "As far as I know," says he, "I am the first to attempt to answer this question from a physiological standpoint." Seriously, no one will try to prove the claims of the Ling system. Only one half-educated, one who does not see the arbitrary construction, and to whom a hollow symbolism, a dry schematism, a pedantic terminology, and a few anatomical and physiological crumbs seem deep science, and who does not see the errors, will be impressed by Ling's works.*

It requires much self-command from anyone who knows what science demands to hunt through those works for such valuable information as one can expect to find from a well-meaning but puzzled enthusiast, as Ling was, whose whole life was given up to a noble work. A physiological answer to the first question *cannot be gotten* out of his works.

Referring to the works of Major Rothstein on the Ling system,† Prof. Du Bois Raymond says, "The kernel of his books is the hollow, restricted, inflexible system of Ling, and around that small head he has constructed a wig of enormous dimensions, made up of material of all kinds, with the express purpose of hiding the threadbareness of the system."

The anatomical-physiological excursions to which he invites his readers are worthless. His treatises on anatomy are extracts from the small compendium of Wilson-Holstein. In his treatises on physiology the author mixes up old views and ideas with the results of modern discoveries in a manner which discloses the perfect incapacity to give a scientific decision often found in laymen who think that for a certain purpose they can easily master and oversee any complicated territory. Again, asking myself if in the works of Major Rothstein I can find a physiological answer to the first question, I must say that I find no other answer than the citing of the old Greek Plato and Ling as a proof of his assertions that bodily exercises are much better if they be simple, but that the German system is to be rejected upon philosophical, ethical, and æsthetical reasons. And let me state here that in all the literature concerning this subject I have never found an answer to the question. Dr. Langenbeck, in his answer to the Prussian minister, speaking of his investigations, says, "By the isolated exercising of single muscles and groups of muscles a boy becomes conscious of the means at his disposal for rendering combined movements." "Let me here correct the error," says Du Bois Raymond, "that at our will we can contract a single muscle.[*] Knowing the position of every muscle in the body does not change this fact. It is a rule that even the simplest movements are brought about by a set of muscles acting in like manner. A system, like the Swedish, that wishes to develop the body by separately exercising all its (muscles or) groups of muscles seems sensible enough. But a closer inspection shows that on the one hand it does too much and on the other not enough. It does too much, because it is *not* absolutely necessary to cultivate each set of muscles separately in order to strengthen the body. A large machine like the human body cannot do a great amount of work along any one line without bringing into play many groups, or perhaps all the muscles of the body, although not all precisely at the same time. How many muscles will remain inactive while executing a high pole vault? A suitable rotation of exercises of this kind offers us the means to evade the weariness that exercising each group of muscles separately must naturally bring with it. On the other hand, a system of this kind does too little, because bodily perfection means more than merely bringing every muscle to its highest point of development. I can conceive of a man having the muscular development of a Farnesian Hercules, who nevertheless cannot be able to stand or walk, to say nothing of being able to execute complicated movements. The natural use of our bodies depends as much upon the correct co-ordination, as upon the strength of our groups of muscles. In all complicated exercises the senses of sight and feeling and also the will-power must ever be ready to act immediately. All bodily exercises, as swimming, dancing, fencing, ball playing, and the like, depend upon a judicious co-ordination of the semi-conscious *im*pressions and *ex*pressions of the will. Such being the case, these sciences are as well exercises for the nervous as for the muscular system. Having overlooked this second side of every good system of physical training is an unpardonable error of the Ling system, which, when viewed from a physiological standpoint, would render it useless. A body educated according to this system will always remain an aggregate of strongly developed muscles, but nothing more. Enough, we see, by looking at the foundation of the system, that it is just the reverse of rational, it is mainly irrational.

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* "P. H. Ling's Schriften über die Leibesubüngen." Translated from the Swedish by Massmann. Magdeburg, 1847.

† "Die Gymnastik nach dem Systeme des Schwedischen Gymnasiarchen," P. H. Ling. Berlin, 1847-1859.

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[*] N. B.—We can move a single muscle, for instance, the *biceps brachii* and the *vastus internus*. The (seeming) exceptions only prove the rule that our will can bring about movements, but cannot exert an influence upon a muscle as such. These movements are simply a change of position of the belly of the muscles.

"Now for the third, not less grave, error of the Ling system which shows this Gymnasiarch as a poor pedagogue. Dr. Langenbeck, in his answer to the Prussian minister, shows the pitiful psychological foundation of this system as openly as any opponent thereof has ever done. "Swedish gymnastics," says he, "in its *pure* form cannot be solely recommended for the physical education of the youth. For weak children * * * * it is too fatiguing; for older * * * * too monotonous and tiresome. Even a boy wants to do something with his strength. By this system his increasing strength is never brought to his consciousness because he cannot be led to see the use of the various movements and positions. Swedish gymnastics undoubtedly answers as a means to strengthen and develop the muscles but it has not the property to give to a boy the consciousness of his bodily force, to strengthen his courage, or to bring about that bodily activity which is so necessary in our lives." "What may I add to this," says Du Bois Raymond, "except that only sick persons will willingly subject themselves, upon command of their physicians, to the horrible tediousness of the so-called rational gymnastics."

Major Rothstein in his works tells us that the Swedish movements "are chosen upon grounds of theoretical principles of the highest order; that an inner relation to moral reality, or to the idea of man, can be discovered therein." "The sameness of nature and soul come to reality in a human being" is brought forward, where all that is wanted is to give a boy red cheeks and healthy limbs. Anatomy and physiology are summoned as aids. "I have had years of experience in a gymnasium," says Du Bois Raymond, "and as a physiologist I have mainly studied the laws of dynamics. But should anyone ask me to sift the exercises of the parallel bars scientific-critically upon a physiological basis, I should be in no small embarrassment. To tell the truth, a simple vault over the bars would necessitate a very complicated and tedious examination by an expert in anatomy and one of even greater skill in analytical dynamics. And what would the investigation amount to? To knowledge of questionable value. I have often exercised with renowned anatomists and physiologists and I cannot recall a single instance where we could have made fruitful use of our theoretical knowledge in explaining the exercises in which we were rivaling to excel.

"How strangely does all this weight placed upon the anatomical and physiological derivation of all their exercises claimed by the Swedes, contrast with the results achieved by the old Greek gymnasts, who knew absolutely nothing of these sciences."

But enough of these extracts. To bring the controversy, which had been carried on over a period of more than ten years, to an end, the Prussian government again appointed a commission to report upon the parallel bar question. This commission was composed of Drs. Lehnert, Casper, Juengken, Horn, Houselle, Martin, Frerichs, and Virchow. After thoroughly reviewing the question from all sides they reported* that "from a medical standpoint *parallel bar exercises are to be recommended; not* forbidden."

The result was an order from the minister to the director of the Central Institute setting forth that the scholars of said normal school be hereafter instructed in the use of the parallel and horizontal bars. That was the end of Swedish gymnastics in Berlin. Even with the official backing of the government it could not be upheld. Shortly after that, Major Rothstein resigned and the German system found itself reinstated in the normal school of the capital of Prussia.

Since that time this system has continually been improved by the experience gained from practical work. "*Grau ist alle Theorie*," says Goethe, therefore it has ever been our aim to put all theories to a practical test before adopting them. Do not for a moment think that because we have an abundance of exercises we take every possible movement into our system. Far from it. This abundance is brought about because our system is all-embracing. We distinguish between gymnastics for the schools, for the army, for associations of adults, and for the sick. Each branch is again subdivided to meet all the needs of each case.

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* "Centralblatt für die gesammte Unterrichts verwaltung in Preussen," 1863.

The German system may be divided into six large groups or classes of exercises, namely :—

1. *Tactics*, embracing marching in all its forms, from a simple turn to all the complicated forms of a *reigen* or evolution.
2. *Calisthenics*, embracing free exercises, short and long wands, dumb-bells, rings, clubs.
3. *Fancy steps* (mainly for girls), embracing all the movements from a simple galop to the most complicated forms executed by expert dancers.
4. *Apparatus work* on the horizontal bar, parallel bars, long and side horse, buck, rings, ladders, poles, ropes, round swing, balance swing (seesaw), balance boards, swinging boards, pulley weights, storming boards, vaulting table.
5. *Popular Gymnastics*, as high, far, and deep jumping, hop-step-and-jump, running, hopping, putting the shot or a stone, throwing the javelin and discus, lifting and putting up iron weights and stones, pole-vaulting, swimming, skating, fencing, boxing, wrestling, shooting.
6. *Games and Plays*, the enumeration of which would take too long. Let it suffice that Guts-muths published our first book of games, in 1793.

Let me state here again that because our system is all-embracing, we have so many kinds of exercises at our command. This by no means implies that we use all of them in every branch of gymnastics. I will here speak only of exercises for schools and associations. These exercises have been divided and arranged, first, into movements suitable for males and females, and again into such for children and adults. The exercises for children have again been divided into from six to eight grades, as the case may be, so that they correspond with the number of school years of the common and grammar schools. The exercises of each grade have been selected carefully and arranged for the class, or special teachers. This has not only been done in the case of the calisthenics, but also for the tactics, fancy steps, apparatus work, and games. The results of the experience of thousands of teachers have been used to determine exactly what can be done by this or that grade, what is more interesting and beneficial for this or that sex and so on. All these divisions have been made, keeping the pedagogical rule plainly in view, that every grade must have exercises that distinctly belong to it, and that new movements are built up upon what scholars have learned before.

There is no other system in existence that has so carefully prepared and built up its work for *all* classes, from the tots of the kindergarten along through all forms of budding manhood or womanhood to those forms of exercises as we still have our old gray haired men performing.

But what our system needs, and that has stood in its way here in America, is competent teachers; men and women who have made the study of gymnastics the aim of their lives. We do not believe that this science can be acquired any easier than every other. To be successful in our work, a teacher must from the very beginning have the qualities of a pedagogue in him. Then he must master the whole field of gymnastics with its auxiliary sciences. He must know his work by having gone through it practically, for no theory will help him teach something that he has never done personally. He must be able to adapt his exercises to the condition and needs of his class. Weather, age, sex, the surroundings, and so on must all be taken into consideration by him. I cannot state the spirit and tendency of our system better than by citing Jahn, who so clearly and beautifully says. "Gymnastics must be practiced in accordance with the spirit of the age, and must be adapted to the needs of heaven, earth, country, and race."

And so it has been. German gymnastics presents quite a different aspect in America to-day than it did forty years ago. It has ceased to be distinctly German and is gradually coming to be the *American system.*

During the last year some of our most prominent educators have taken a stand against all systematic bodily exercise, claiming that this offers no recreation to scholars after much brain work. The point made is, that brain work and systematic bodily exercise both exercise the high nerve centers, so that systematic physical exercise, instead of relieving these centers, again brings work to them. I acknowledge the point as being made when one thinks of the exercises as conducted under some systems, or by teachers who are not specially trained for such work. But this statement does *not* hold true in all cases. It is one of those theories that are not upheld by practical experience. Almost daily experience has taught us that one cannot offer to a class that is dulled by an excess of mental work any better recreation than ventilating the room, having the scholars rise and giving them a few lively exercises that send their blood coursing through their veins and brighten their dull eyes. Yes ! you may even use music to help to do this. Let me assure you that this very same class of children will do better mental work after five minutes given to such exercise than they did immediately before. Only do not, in a case of this kind, give your scholars a set of exercises arranged ostensibly according to the laws of anatomy and physiology, for if you do, they will surely break out in open revolt against such usage as soon as these exercises have lost the attraction of novelty.

Allow me here to offer the experience of the gymnastic societies, "Turnvereins," of the United States, many of whom have been in existence since 1848-50. Every society has its gymnasium for children and adults. The scholars enter these gymnastic schools of their own free will. The class hours for children are directly after they have been dismissed from the public schools. The men come in the evening, the ladies usually early in the afternoon. These schools have an attendance of over 40,000. The majority are naturally German-Americans, but I am glad to be able to state that the number of Anglo-Americans is increasing yearly. I now ask how could we keep this yearly increasing mass of scholars if our system did not offer them something not found in others ? Is it to be supposed, that, if the moment they left their brain work in the schools to come to our gymnasia and we, by our exercises, should again mainly tax their brain, we could have held these classes for a period of over forty years ? Here practice shows, as far as our system is concerned, that theory is at fault. How often have scholars of my class of older men, composed mainly of doctors, teachers, and business men, at the close of a lesson said to me, "This evening I felt so overworked that it cost me a great effort to come to the gymnasium, but now I feel like a new man." How could this be the case if our exercises had again exhausted these brain workers? Allow me to recall the words of Director Lion, who years ago, when speaking of the effects of systematic gymnastics upon him, said, "In sorrowful hours, when wrath, anxiety, and sorrow rose in bitter billows in my heart, so that it seemed as if head and breast would burst, I have, by these exercises, dispelled my cares and found oblivion. Though but for a few hours, yet these were not to be bought for gold."

If the American public will adopt a system of physical training, they must adopt one that has life. They must have one that answers for all needs, be they those of the public schools, colleges, universities, associations, or the army. They need a system that possesses the quality of conforming to the needs of our country. The system that answers all these requirements is the one we represent.

I append a list of larger cities in which our system is taught in the public schools :—

Kansas City, Mo.; Chicago, Ill.; Cleveland, O.; Davenport, Iowa; St. Louis, Mo.; Milwaukee, Wis.; Columbus, O.; Dayton, O.; Indianapolis, Ind.; Rock Island, Ill.; Duluth, Minn.; Denver, Colo.; Sandusky, O.; Erie, Pa.; New Ulm, Minn.; Canton, O.; also at the Military Academy at West Point, N. Y.; the Naval Academy at Annapolis, Md.; the Cook County Normal School at Englewood, Ill.; Washington University, St. Louis, Mo., and its branches, Smith Academy and Mary Institute; and in hundreds of private schools all over our country.

CLAES J. ENEBUSKE, Ph.D.: It has been said by the preceding speaker that anyone who attempts to defend the Ling system against the German system proves himself thereby a half educated smatterer. Under these circumstances there is needed courage to appear here. I have not been trained to my courage on the trapeze and the parallel and horizontal bars. Perhaps it is that courage is the birthright of every Swede and even the poor Ling system cannot extinguish it.

Germany has a glorious history, but I can tell you confidentially that from the very speech we have listened to I have discovered one great advantage of the Ling system. The Ling system offers a pedestal from which we can look out and see and conceive the beauty of the history of the German gymnastics, an advantage that the German system does not have with regard to the Swedish. Every man's fatherland has a glorious history. I think you will back me up in that, and to the credit of the human heart I shall never cease to believe that it will always be so.

I have not prepared any address for this occasion and consequently can only make brief references to some of the points as I have noted them while listening to this interesting address. "Thirty years ago a battle was fought out on German ground between the Swedish and German systems, and now it seems there is similar battle on American ground." I do not blame the Germans for not having been willing to adopt Swedish gymnastics in Germany. There is a great difference between willingness to adopt Swedish gymnastics in Germany thirty years ago and willingness to concede the intrinsic qualities of the Ling system here to-day.

Virchow and Du Bois Raymond have been quoted here. Their doctrines have been educators of the world; for the Swedes as well as the Germans, they belong to humanity. But neither of these honored men was a gymnast. One was a physiologist and the other is a pathological anatomist.

A MEMBER: They both learned the Turning system.

DR. ENEBUSKE: I do not deny that, but they are not acknowledged as authorities in Swedish gymnastics. Quotations have been made often from them, but these quotations have shown me that the force of their arguments was directed not against the Ling system but against their own misconception of it.

I must consequently ask my German friends to speak on their own behalf. You are brave men enough and I shall be happy to meet you! I will not argue against this physiologist and pathologist on this occasion, and I think you will say, that is right. It has been said that the Swedes cultivate the strength of only single muscles. Is there any human being who can contract a single muscle without calling others into play? I cannot understand how anyone dares to make such a statement. In all the movements we make, a great number of muscles must come into play. Some muscles have the function of steadying the levers of the body in a certain relation to each other, while other muscles move one or several levers against the others. Still others antagonize the action of the former. So we can speak of steadying muscles (*muscles fixeteurs*), motor muscles (*muscles moteurs*), directing muscles (*muscles directeurs*), and antagonistic muscles (*muscles antagonists*). In all active movements they are in play, but this fact does not exclude the other fact, that in all these movements the greater amount of the work is localized more in some one place than in another. That leads to certain differences in the reactions upon the body as a whole in the different movements. This would be easy to demonstrate, but here is not the place for such demonstration.

Ling's writings have been criticised. Ling's writings are chiefly poetical. He wrote no physiology, he wrote no anatomy. The physiology of the year 1800 was not the physiology which Du Bois Raymond has contributed to the world.

Can anyone in the view of Du Bois Raymond's physiology imagine that when a German hangs by his hands on a horizontal bar and contracts his muscles that he exercises his brains, nerve-tracts, and muscles, and the result is the training of the whole man, but that when a Swede hangs by his hands on a boom and contracts his muscles, that he exercises single muscles alone, and the result is only an "aggregation of muscles" but not a whole man? [Laughter.] Is that possible? It is the theory of German gymnastics that has been advanced here.

Everyone knows that German gymnastics are cultivated in connection with social and political ideas which lend to its popularity; the Swedes make a distinction between gymnastic movements, political movements, and social entertainments.

When you speak of Swedish gymnastics as being good for the sick alone and not for sound people, you are speaking of medical gymnastics, but we are here now to discuss pedagogical gymnastics. When we are discussing pedagogical gymnastics proper, we do not speak about popular sports and games. In Sweden also there exists every kind of game and sport. Can anyone say that the game which the Germans played in the hall last night, the game which they call "*Katze und Maus*," is a German game? When the Swedes play it, they call it "*Katt och ratta*," and when it is played in the Boston Normal School of Gymnastics it is called plainly "Cat and Rat." Now, it is German, it is Swedish, it is American—what is it? To see what it is, we have to be historians and archeologists. Some of the games that are played in the valleys and fields of Sweden, in the open squares, in the gymnasia, and even in the parlors sometimes, can be traced back more than a thousand years. Some of those old games as well as the folklore and folksongs can be traced back to an Oriental origin. Some others go back to the countries of southern and western Europe. The Vikings were great warriors. A thousand years ago their vessels ravaged the shores of Europe. They took with them the strength and hardiness of a sturdy race and in return brought back a little more cultivation from those more favored peoples in the south of Europe. But they left some impress of themselves there. They inoculated these at that period more effeminate races with a little of their own manly valor and retained something of the higher culture of the southern people ; such are the reasons why many songs and games are similar in different nations.

It has been said here that the Swedish system is monotonous. If the teacher is monotonous, anything he teaches is monotonous. [Applause.]

The variations of exercise in the Ling system have their only limitation in the obligation of the teacher to use the part of the school-session, for the proper use of which he is responsible, to the greatest possible advantage of the pupil and the school.

It makes a peculiar impression, when my German friend in the beginning of his address seeks shelter in quotations from the most eminent physiologist and anatomist of the age, but at the end of his paper he emphatically denies that anatomy and physiology have any right of decision in the selection of gymnastic movements and even asserts that such participants will destroy the beneficial joy of the children. Is this the logical consistency of German turning? Joyful games and play are the source of gymnastics. It is true of the Swedish as of the German system, that they take hold of the joyous element of human nature. That is one of the particular features of the Swedish gymnastics, that the joyous spirit of play is one of its essential elements. But this must not interfere with the earnest dignity and scientific exactness of it.

We are not talking of all kinds of play, when we speak of pedagogical gymnastics,—because we consider it necessary that some of us should make a distinction between practical pedagogics and practical picnics. [Laughter.]

It was moved and seconded that after the next speaker, remarks should be limited to three minutes for each.

Col. Parker opposed the motion.

Mr. Bolin also opposed the motion.

On motion, the motion was amended to read five minutes and it was then carried.

A paper was then read by Mr. Karl Kroh of Cook County Normal School, Illinois.

After a careful perusal of Dr. Hartwell's recent report on "Physical Training in the Boston Public Schools," I concluded that it was an excellent paper, the most carefully compiled of its kind I had yet read, certainly the first, so exhaustive in detail, published by any of our school boards.

I recognized in it a document of possibly greater value than may have been anticipated at the time of its publication, for it occurred to me, that it would not only prove serviceable to all interested in the development of physical culture, but valuable as well for future reference, especially to those who at the time of this discussion had already served almost a lifetime in a field of labor destined in the future to attract more universal interest and to inspire more profound thought and study than many other branches within the scope of educational possibilities.

What would be the final outcome of the all-sided endeavors to bring out, in general discussions, the salient features of systems brought into such prominence at this date, as the German and Swedish systems of gymnastics? Would the perfection of either result in the adoption of something "universal," or, would the old established and ever new features of the ever growing German Turnkunst in the end find that general recognition that has never yet suffered when once established? Or, would it be possible finally to substitute something altogether different in its stead, for which credit as to originality could really be claimed?

It occurred to me that strenuous attempts were being made here and there to lend to the great work before us the stamp of some one's originality, and that many who would remain with us long enough to witness some of the possible results of the many efforts would yet conclude that it was to an extent folly "*in die Ferne zu schweifen da das Gute so nahe lag!*"

The esteemed President of this association deserves much credit for the earnest way in which he has directed thought to a branch of education that promises in this country to attract more general attention and to arouse more general enthusiasm than in any other. To the millions that have already been expended in university, college, and school gymnasia, will be added other millions for the public school gymnasia. The interest betokened everywhere by the leading educators for this branch attests to this probability.

I have been in what has been termed, how accurately I will not say, the "new profession" for nearly twenty years. During this time I have, whenever opportunity offered, striven to imbue others with the spirit of the German Art of "Turnen." In this art, there has always been to me an incommensurate something indicative of a certain perennial source of youthful strength and power.

It is probable that existing differences of opinion, as to which of the systems of physical culture now in vogue in this country is the most advantageous for our school system, will not immediately upon the adjournment of this meeting cease to exist,—influences to an extent favoring the promoters of the Swedish system, such as the participation in the practical part of this day's order of a class of students fully prepared for the occasion by daily practice during a course covering several years; the equipment of a model Swedish gymnasium, etc., advantages not equally shared at this time and place by the advocates of the old established German system,—such influences having in a measure no small bearing at this stage of the discussion on the general propaganda. I trust, nevertheless, that all systems of physical culture will be carefully considered.

The interesting report of Dr. Hartwell is the result of careful and studious work, and, until I reached the paragraph opening with the statement, "In comparing German and Swedish schools of gymnastics, the distinction between an artisan's kit of tools and an instrument of scientific precision suggests itself," I found nothing that raised a doubt in my mind. Strengthened as I have been, more and more with each succeeding year, in the belief that the German Art of Turnen will in due time, after a long season of experiments, gain the place destined for it in the public school system of our land, I felt constrained to pause and ask: Has the esteemed author, as Father Jahn would have said, "lived in it," has he experienced it, become imbued with that spirit which manifests itself from within? Has he in reality tried it, persevered throughout all its exactions? Has he probed it, examined it? Has he, after long and persistent trial, so tested it that his judgment can stand? This bit of skepticism perhaps would not have found a place here, had not the above comparison suggested it.

The loyalty and patriotism of Jahn, even at this day not deservedly appreciated; his determination to rejuvenate his people; his love and devotion to the Fatherland; his indomitable will, surmounting all obstacles, enabling him to endure all hardships, together with a sublime faculty for discernment in regard to the true methods for securing the realization of his life's aim; his keen foresight as revealed in his prophecy of the ultimate restoration to future greatness of his people, which allied to him others who were quick to rally to his convictions,—made possible the advent of that era of physical and mental regeneration which to so great an extent has made possible Germany's present power. He stood as sponsor for the Fatherland. The Prussians have since given to the world the axiom: "What you wish to appear in the life of a nation you must put in the schools." To-day we can trace the streams of this life-giving fount, this exhaustless spring of youthful vigor, "*die Deutsche Turnkunst,*" throughout all the lands of the globe.

In the question under discussion to-day enter factors that treat not only of possibilities in the schoolroom, behind and between school benches, that relate not only to chest expansion and to healthful movements and to minutest details of physiological effects, etc., but factors that include the whole being of man. Even though we may claim much for physical education, it remains, in order that we may secure all advantages that can possibly accrue in this vast field of work, that we review such phases of the work before us that especially enhance it, phases not dwelt upon in the everyday burden of physical culture propaganda. For of a system of such a high standard that it can be regarded as adequate for all requirements of our youth, that will also develop that grandest faculty, reason, we can ask much more than it has been possible up to this date to incorporate in either our Eastern or Western school work.

It is possible, to some extent, to secure good results with the limited resources at our disposal ; it is true, that we can even recognize a steady improvement in the physique of our pupils, that is satisfactory to our patrons. But, as I said, in order to attain the highest results we must labor for the adoption of such additional measures as will enable us to point with pride to what in reality can be accomplished in our schools, to the wonderful growth of our charges in bodily grace and mental strength, to the new discipline, the outgrowth of physical training, which enables our teachers to secure more work and better results. The cheerful spirit of our boys and girls must become manifest in better ways than at present, and the spirit of patriotism, that should dwell within and ennoble our youth, must grow more and more with the consciousness that all are strong, healthy, self-reliant. The increased activities must facilitate greater progress in all the nobler pursuits of life. What factors are necessarily to be considered in connection with these possibilities ? And what conclusions can we arrive at upon comparison of systems in vogue, so highly lauded as the Swedish and German ?

I might itemize a preliminary review under the heads of :—

1. Teachers,—regular, special ; requirements.
2. Time,—periods for class work, mass work in halls or gymnasiums, play.

3. Systems, — comparisons, summaries of respective features, and continue as follows :—

THE REGULAR TEACHER.

To the regular teacher is to be intrusted the A-B-C work of gymnastics. Preparation in special courses, the attendance upon which should be obligatory, by special mandate of the school board, should be given. The work in these special courses must enable the teacher to give gymnastic exercises in a progressive way not only at designated times, but whenever required. Teachers should be advised and instructed so as to become proficient in the games and plays they should be required to direct on the playgrounds during recess and at other times. Games and plays, carefully adapted to grades, are found in abundance in the literature bearing on the German system.

The criticism given by experts of the teacher's work should determine either her success and ability to teach or her failure to comprehend the import of the different phases of gymnastic work as indicated in the special course. Failures should be provided for in supplementary courses.

THE SPECIAL TEACHER.

The gymnastic work proper, as massing of classes in school halls or yards, equipped with gymnastic apparatus so that all can be employed at one time or employed in turn (at times the more preferable way), the selection and order of apparatus, or other work, the careful assistance to pupils during exercises, for aid under the varying conditions of in or out door work, together with the observance of a *discipline that will at once permit freedom of development within the general plan that must govern and unite all,* entail obligations that can be intrusted only to the special teacher having full and practical knowledge of the subject in hand, who must be a master spirit himself. The enthusiasm following in the wake of his work speaks either for or against his ability as teacher of a branch requiring more devotion, hard work, and self-denial than most others.

TIME FOR CLASS-ROOM AND HALL WORK.—PLAY.

During each half-day session a period of from ten to fifteen minutes should be devoted to physical exercises. Besides, the regular teacher should, whenever interest is on the decline from whatsoever cause, arouse his class by short intervals of exercises. Twice per week, at least, no less than thirty minutes for each class should be devoted to hall or gymnastic work. This work should be preceded by carefully selected order movements, interspersed with such work as may be suited to prepare the pupil for what is to follow, — the teacher should be a master of German "*ordnung-ubungen,*"—in order that quick and quiet massing can be had without delay as pupils become more and more interested in the work proper, that of developing the muscular organism. The time for order movements should be limited to the minimum.

How to ascertain the required number of special teachers for this work cannot be definitely stated until we shall know whether our school authorities are courageous enough to order the adoption of the proper dress for the feminine portion of the pupils, so that they may work unhampered, in an unrestricted way, either separately, or the sexes together. How much depends on this dress reform of our pupils who so need it cannot be estimated, for, with their equal participation in the advantages of physical training, the most sanguine hopes will be realized. Effective and good results require much time, and since it is true that to develop the mental faculties we must first have the physical basis, it is not too much to assert that conditions being favorable, for every two or three schools, there should be furnished a physical instructor.

"Play-day" in the spring should be devoted to publicly playing games, arranged with due regard to a certain progression. Special games that may have been mastered during the school year, requiring unusual skill, may be made special features. The half holidays should close with simultaneous play of as many thousands of pupils, boys and girls, as could find place on the commons under the direction of their regular teachers. This should, where large open-air gymnasia have been erected, be preceded by gymnastic exercises by all to whom places could be assigned. The all-round graded class work in popular gymnastics, or what has also been termed athletics, should find ample illustration in this part of the programme. This, the hastily written outline of provisory regulations for all school systems wherein the German system of gymnastics has been adopted.

Let us hope that the day may not be far distant, when two half days of the school week can be devoted wholly to physical culture; when in all our parks spaces will have been set aside for large and complete open-air gymnasia, similar to the one erected on the banks of the Charles river, in Boston.

SYSTEMS.

The systems that are followed with so much enthusiasm in this country at present are the Swedish and German systems. Both systems have been sufficiently tested to justify the comment called for by the present conference. It is not necessary in comparing the two systems—for which comparison I wish I had had more time at my disposal—to refer to the respective founders of either, or to repeat all that has been chronicled during the last century regarding their evolution.

It is true that the most of that which is said by the writers of to-day upon Swedish gymnastics reads very much as if it had been written for the German system. In school gymnastics, change and variety are deemed necessary, and to secure them, the recognition of the laws of physiology and the principles of sound teaching are deemed necessary. A great deal is said worthy of indorsement, also a great deal to which we who teach the German system take exception.

If, for instance, comparison with Swedish teachers of gymnastics is met with the statement, that comparison with those of any other country establishes the fact that they are a small but highly trained corps enjoying certain advantages, that even from its inception the majority of the pupils at the Central Institute have been young officers in the army and navy, etc., then I would say, do not let us court comparison upon this basis alone, but in the names of the tens of thousands of teachers of this great land, who will, ere long, be required to teach gymnastics, who cannot procure for themselves a diploma in some other field of beneficent labor, so that their ability to teach may not be decried or questioned by the hue and cry on account of a failure in professional knowledge,—in the name of the guardians of youth, I say, let us hold to that system which, if not adopted now, will be surely adopted, as the value of the work of the German system becomes better appreciated.

I would also refer to all those who have received the benefit of German methods the statement (in order to determine its accuracy) that "by means of the 'day's orders' and the principle of 'gymnastic progression,' which the Swedes *alone* have fully worked out and adopted, they are enabled to order and vary their school gymnastics from day to day, month to month, and from year to year, in a graded series! That, no matter what the age or condition of health, the pupils are advanced from simple, absolutely easy, and safe exercises to those that are complicated, difficult, or comparatively *dangerous*" (the kind, I suppose, on another page of the same work I quote from, unceremoniously relegated to the rear, termed as useless).

Have we slept all these years to awaken on the dawn of a new era, to hear our tutor's words again? Is there nothing new under the sun? Must these truths be born over and over again, before we can fully realize that they have long since existed? The statement that the Swedes alone have a line of progression is not only incorrect, but implies prejudiced antagonism, rather than intelligence on the subject, for grading has been, and is, peculiar to the German system. I grant that I have seen teachers of German work whose methods of instruction could have been vastly improved upon; that the proper exposition of a system depends in a degree on the individual undertaking it, but that is no reason why we should be misled in our judgment by inaccurate statements.

"Swedish gymnastics surpass all other forms of pedagogical gymnastics," is the bold and initial statement of a paragraph better suited, I claim, to German than Swedish work. And, in going over the evidence that ended with the discontinuation of the Swedish propaganda in Germany thirty years ago, although it had the support of the Prussian government, we meet conclusions referring to the "deplorable psychological basis of the system" by a Du Bois Raymond! The monotony of the work, according to Dr. Langenbeck, does not permit the youth to realize his powers, by making him self-reliant through recognition of work that promotes courage, agility, and the thorough development of those qualities of such importance throughout a lifetime, as confidence, decision. Dr. Angerstein sees in the work disaffection, consequent relaxation of energy, and declares that in comparing the German Turnen with the Swedish work he finds the latter devoid of all moral suggestiveness, of cheerfulness of spirit, amiability, sociability, of encouragement towards the higher traits and characteristics; he declares that the system was called rational, but in reality he found it pedantic. It does not recognize in man the intellectual and vigorous being or organism, but simply a muscular system, for which, in selecting exercises, it continually calculates the degree of volume of the separate parts (muscles) and how to heighten the energy of a possible contraction.

If the executive or working mechanism of the body is recognized in the muscular and nervous tissues, as the animating and controlling influences upon the other organs of the body; if it is recognized that well directed exercises of the muscles are requisite for the maintenance of the health of the brain and for the development of its full powers; if it is conceded that muscular training which fails to develop brain power falls short of its aim,—why, then, it is simply evident that the German system, which supplies all these essential factors in physical culture, the system upheld by the convincing arguments of legions of pedagogues, professors, and doctors, and a literature of a century's growth,—such a system should not be superseded by any other system unless it could show equivalent results or a more rational theory.

Without doubt, the Swedish system has undergone many changes latterly, and I am assured by one of its advocates that it is not the antiquated system of bygone years; that that which had been declared harmful a few years ago has found a place in the work of to-day; I am furthermore assured that educational gymnastics from the Swedish point of view are not to be confounded with the Ling system, pure and simple, but, for all that, I incline to the belief, also expressed by a learned physician, that the work for pupils of tender age is too exacting, and for those of higher grades not enlivening enough, too fatiguing.

Moreover, it is a question with me, if exercises as bending forward with arched back and stretching upward of arms in this position can be of the beneficial results claimed for it, or if any strain-bending positions in which exercises are executed are as advantageous even as would be the case were the movements simultaneously executed. The claim that separate groups of the muscular system should and can be exercised in a methodical way, or the different groups successively, seems to me in the majority of cases not exactly an illusion, but a new view from an educational standpoint. I doubt if any of the advocates of the Swedish system, no matter how perfect their knowledge of human anatomy, or how accurate their analysis of the human mechanism, will be able to uphold this theory in practice. It is through the proper co-ordination of the different groups of the muscular organism that we should secure harmonious development. We should not and do not presuppose the sick or deformed person, but seek to assist in developing a reasonably healthy school pupil.

The German work, besides, although claiming no patent for any special work, does not, as the Swedish leaders claim, —holding that apparatus work is entirely unnecessary in securing development,—exclude the use of hand apparatus. It is splendidly adapted to rouse the indolent, to combat the slothful in nature, indisposition to work, and inaction; it encourages action of body and mind, and regards music as a most valuable means to this end,—in order that aversion may be felt for that condition of ease and laziness so much preferred, the result of the many artificialities of life. The pleasing forms in every variety of work, secured by means of hand apparatus that gives the pupil something he delights in handling, the more skillful he becomes, exclude all monotony complained of in Swedish gymnasiums.

It seems to me if we should apply anatomy and physiology to all human expression in the degree to which we apply it to Swedish gymnastics, we should be certain to lose sight of the main and important feature of the work, and specialists would need to be employed or intrusted with the solution of problems that constantly arise, problems that would at this stage, in the infancy of the work, be left to solution in the studies of those whose time is not entirely devoted to the practical side of the work.

The advantages of the German system are that none of the movements recognized in the Swedish system are excluded from it; they are recognizable under more varying forms and consequently cover a greater scope of possibilities.

The fact that some fifty modes, and probably more than that number of combinations of exercises under as many different captions in free movement exercises alone, are possible to the extent that what I have called the A-B-C term has been extended over from six to eight years in several instances, and that interest, I am told, has never lagged, ought to speak for the older system. Could, in the face of such results in the one department of the many of the German gymnastics, the American youth become enthused over Swedish gymnastics? Would they flock, as did the German youth, in throngs to the playground, to the gymnasium? Is the Swedish form of work interesting enough to arouse our boys to that endurance that must come of their own volition, lasting enough to regenerate us physically? Has it that quality that can enthuse us all, that will enable us to approach that perfection which for us exists only in the ideal?

As surely as the Greeks had their wonderful system of tactics, that enabled them in impregnable phalanxes to face all dangers, so, truly, wherever we may turn and pause in the German work, we see a lesson. The order movements, for instance, of the German system, an important part of it, —although the question of their value as a form of exercise has brought forth many differences of opinion, that must be ascribed to existing conditions that admitted no extension of a system, rather than to other causes,—admit, wherever they have to an extent been practiced, the execution of a never-ending succession of desirable exercises that grow more interesting as they become better understood. In this work the pupil is taught a lesson that has not infrequently served as the basis for many other directions given him, concerning the relation of the commoner to the commonalty, of the individual to his class, to the general and accepted order of things, the efficacy of which makes possible his subjection to the rules of the playground for instance, where he may cultivate that control over himself already assured in part by the gymnasium work ; where the teacher, whose knowledge of the play rules and regulations must be adequate, participates only as a leading, guiding mate, to whom appeal is so seldom made that he himself becomes a participant in the " work " in a sense which no other branch of education allows to such an extent. It is in this work in the garb of pleasure,—play,—where applied gymnastics have such a wide range, that the future burgher can be molded. Here, on the playground, we present and provide those conditions that permit the unhindered exposition of all those traits and characteristics that can be enumerated, where the uncontrolled energies of exuberant youth can be directed into the proper channels, where the youth is trained to become reasonable and prudent. The teacher of the German system of gymnastics must be thoroughly qualified, must prepare every step of the work, not by means of prescribed text-books, but by devoting more than casual attention to the qualities and the different phases of the work that can arouse and develop his pupils. He is given an additional opportunity for study of the pupil on every hand, and conscientiously takes advantage of it, delighting in the results he can now bring about. He is able to discern tendencies, qualities, that he may draw out, lead ; he trains the weaker, governs and curbs the stronger, impulses ; he awakens dormant powers and springs to the rescue by cultivating an ever-growing love for the more valuable features of the work.

Would you turn the youth from the more tedious work to that which brings with it a light heart, lead him to where he can be at peace with himself and all ; do not encourage him to wander where one-sided sports, so-called athletics, employing a few for the amusement of the thousands, are fostered, but to the place where nobler bonds are cemented than in most other fields devoted to noble aims.

It is the practical side of this education, so full of problems, approached more nearly by German methods, that should impel educators to discern or to distinguish proper methods in the best work of physical culture. It is, in part, the superficial way of dealing with a subject destined to become the most important branch of education, that makes it possible for dealers in theoretical notions to palm off their theories, with the result of leaving those who have little knowledge of the practical work, its laws, regarding healthful development, to flounder, after a long term of attempts to do the proper thing.

We need not become mere imitators, or to echo foreign mannerisms, but we can greatly add to results already proven highly satisfactory by placing the science of physical culture on a better footing.

The discussion was then continued.

BARON NILS POSSE: As I am a graduate of the Gymnastic Central Institute in Sweden, I may be supposed to understand the principles of the Swedish system. Yet what I shall say will probably be a surprise to many of you. It has recently been stated that I was so liberal that Sweden was too small to hold me. That statement, however, will be rectified before long. Those ideas of liberality I imbibed from those who teach gymnastics in Sweden. They do not go by set rules; they do not say, "Here are your exercises, apply them." They say, "Study your pupil, learn his individuality, and adapt your exercises to his needs." On that plan, the Swedish teachers of gymnastics, that is, those who have studied gymnastics there, often apply exercises quite different from those known in this country as "Swedish gymnastics pure and simple."

It is a peculiar fact that one of the professors in the Central Institute has published a book on Swedish gymnastics containing movements with dumb-bells, Indian clubs, wands, etc. And our teachers say, "Never limit yourselves to apparatus,—use whatever is at hand that can be employed to advantage; do not go into a gymnasium and insist upon this particular piece or that, and if there are machines not exactly Swedish, do not let them become dusty and rusty for want of use; for it is the exercises, not the apparatus, that make the system." A teacher who is limited to one form of movement or of apparatus is a poor teacher and is not a master of his profession.

You will find, after all, that the German system does not look so different from the Swedish. I am not ashamed to tell you that in my Boston gymnasium I have dumb-bells, clubs, wands, parallel bars, etc. If you can prove that my methods are wrong, I am ready to be convinced, but I can state that nowhere in Ling's writings, nor in the teachings of the present faculty of the Central Institute, have I ever found anything to prevent my using such apparatus and yet remaining true to Swedish principles.

We are taught not to give to all the same form of exercise, but to fill the needs of the individual, to fit ourselves to the surroundings, and to remember that among the leading principles that must form the basis of all gymnastics the world over, are the questions of nationality and of individuality. While it may be true that anatomy and physiology are the same the world over, and that human nature is the same, the mind is not. A Swede is not like a German, nor is either of them like an American,—as we have found out to-day. You must take this difference into consideration when making up your exercises, so that these correspond to the laws not only of anatomy and physiology, but of psychology as well. And whosoever teaches gymnastics must understand something about these laws, or he will violate the laws of nature,—he will kill individuality. If the American nation chiefly consists of Germans, by all means teach the German system. If it is made up of Swedes, teach the Swedish system ; but if the chief bulk is made up of Americans, teach them *gymnastics* based on the laws of nature ; and, if you need a prefix to the system, call it "American."

I think the whole question of system resolves itself into an entirely new one, the qualification of the teacher. The one to whom you intrust gymnastics must be familiar with exercise as a science, and with human nature. He must have studied the laws of individuality and of psychology. If you have a teacher thoroughly qualified to teach, leave him alone. Tell him to go ahead and teach, but do not tell him to use this, that, or some other system. Do not by any means limit him to some particular apparatus, or to any set forms or rules, because that will kill gymnastics, no matter what system you use. Give him free hands, and remember also that he is an individual,—not a machine.

JAKOB BOLIN : It appears as if a great deal of the battle between different gymnastic systems arises from ignorance with regard to them. I have every reason to suppose that such an ignorance prevails among us Swedes with regard to the German system, and I know conclusively that the Germans labor with the most wretched ignorance of the system which we uphold. A great deal of the discussion here has moved about play and games. But we Swedes do not include these in our "gymnastics," which term in the sense you take it is broader than in our language. We use play and games, acknowledge their value, and stand firmly on the ground that they are not only desirable, but absolutely necessary in a complete system of "physical education," inasmuch as their recreative and therefore hygienic influence cannot be gained by any other means ; but within the "school gymnastics" they do not belong, as we take that term—and it is gymnastics for the schools that we should discuss here. With this I do not mean to say that the "gymnastics"—under which term I include only what we all understand under the names of calisthenics and apparatus work—are not also of value as a means for recreation, but only in the same sense as change from one kind of *study* to another is recreative, though perhaps in a greater degree than the usual changes, as the difference between this *work* and the usual school work is greater than between the different branches of study in the popular sense. But the greatest value of "gymnastics," in the Swedish sense, is their corrective influence upon the purely physical sphere, abolishing or alleviating the evil results of inactivity in more or less faulty and injurious postures, which we find on the playground just as often as in the schoolroom, and which we must correct wherever they have arisen. In this respect we claim superiority for the Swedish system, and I for one am more than willing to abide by the judgment drawn from the examples we have seen here of the different systems : on the one hand these children, among whom the majority have stooping heads and round shoulders, with their unavoidable sequel, flat chests ; on the other hand these young ladies, whose very bearing and carriage preach a sermon on the excellency of the training they have received, a sermon not to be forgotten.

MR. ARNOLD, of New Haven, Connecticut : I have two points that I want to bring up. I understand that the

Swedish system does not make any difference between exercises for males and females. We think that the anatomical difference between men and women justifies us in drawing a dividing line in the exercises. We claim this to be one point where we are in advance of the Swedes. Again, the Swedes want every movement to be executed on command. We employ this method also to a certain extent. But we think we have a good many motions that we have to perform in daily life without will and consciousness, and the ultimate training should be such that there should be certain exercises acquired by rhythmical exercise without command. In walking, though the first step may be taken with will, the others are produced by reflex actions, we do not know much about them at least. Our mind wanders to something else. We should in gymnastic exercises be taught to walk right without the will and there should therefore be exercises not only with command but in rhythm. We also see the use of music. It is a good thing on a dull or rainy day when the air is heavy, to go to the piano and let the pupils do the exercises to music. In that way one can often overcome the difficulties of the day.

Then let us consider the subject of "gymnastic progression." If you look at that at first it seems rational, and may perhaps be so in theory, but in practice it is not. I wish some of the Swedish teachers here would give the exercises who believe in their progression. But Mr. Posse shows that they are coming round the corner and are beginning to accept some of our apparatus. Even the parallel bars will not remain excluded.

MRS. LEITER: During the session this afternoon two thoughts have impressed themselves on my mind, first, the wealth of our plans for giving physical education, and, second, the breadth of the application. Now, if I am correct in my judgment, those who are assembled here represent the work in our colleges and in our higher seminaries. Now I would like to take you to our state of Ohio. There, outside of Cleveland, Cincinnati, and perhaps a few of the larger towns, we have nothing of this instruction in our schools, and we need it for the million of Ohio children who know nothing about it. It seems to me that in discussing the question of system here we are forgetting the great fact that we must resort to plans that will reach all the children of the nation or we are not meeting the work that rests upon us. We have heard something about "suspended judgment," but I want to tell you about the arrest of thought that has come to the great organization of women who have been called radical in some of their views. But they are scientific in their plans and they are always progressive and when they have stood facing the question of total abstinence for these people they have come face to face with this question of physical education. Now if we enter our schools and take from the children the long cherished idea that alcohol is a tonic we must give them the idea that the true tonic is found in exercise properly taken. The work of the W. C. T. U., which I represent, is going to reach this suspended judgment, and I want to assure you that it is not the purpose of our organization to attempt to discuss this question or settle on methods. But we hope to secure legislation which shall make it compulsory for schools to give physical training. We have demonstrated our right and ability to do this work properly and we intend to go forward in it. But we need the co-operation of this body of educators. But as I have listened to this discussion it has seemed as though it were better to turn our attention from systems to getting right of way in our schools. We ask your co-operation.

President Hartwell showed to the Conference two bills which had been presented in Ohio to make physical education compulsory. One passed but was vetoed by the governor. A similar bill has passed through the Ohio House of Assembly and is now before the Senate.

The following reports and papers were then presented but not read.

REPORT OF PHYSICAL CULTURE IN THE PUBLIC SCHOOLS OF WASHINGTON, DISTRICT OF COLUMBIA.

BY MISS STONEROAD.

For many years, those having at heart the welfare of the public school children of Washington have realized that something should be done to improve their physical condition. As an educator, interested in the best development of children, our superintendent of schools appreciated the value of physical training as a factor in that development. He realized that with physical gain would come the possibility of moral and mental gain; that a healthy child would have greater chance for moral growth, and that with increased physical power would come increased brain power.

As the result of his efforts, three years ago, the Board of Trustees of Public Schools of the District of Columbia introduced physical culture into the public schools under the name of health exercises. The work was given in charge of a directress with two assistants.

Immediately the question arose, "What is the best system for public school work?" Investigation of the different systems then in vogue in the public schools of our country showed that comparatively few cities or towns had a compulsory course of physical culture graded from the primary up through the grammar schools. The cities which had such courses were mostly in the West, where, with few exceptions, the German system had been adopted. However, we were unwilling to adopt any system without much study and thorough investigation.

We did our best under the then existing conditions. We had no gymnasiums or vacant halls. It was necessary for the pupils to work in the spaces between the desks, and for the regular teacher to lead in the daily exercises. Teachers were called together to receive instruction in breathing, in taking healthful positions while sitting or standing, and in methods of giving the simple exercises then introduced.

Our first work with the children consisted of exercises intended to strengthen the parts of the body wherein they were weakest. Our children did not know how to stand, so we began with those exercises which strengthen the muscles used in maintaining a good standing position. We next devoted special attention to expanding chests and straightening backs, giving exercises which had a direct bearing on these parts. Following, came exercises to raise the ribs, increasing their mobility and thereby the capacity of the chest. In this connection many stretching exercises for all parts of the body were given to counteract the tendency, in everyday life, to the over-use of the flexor and the neglect of the extensor muscles.

It will be observed that our aim has been, and is, to increase the general health, rather than develop muscle. The exercises have been hygienic in their purpose as indicated in the original name of "Health Exercises." The development of strength of muscle has always been a secondary consideration. We have thought more of the effect of muscular action on nerve centers and on the internal organs whose normal action means health. Having exhausted all American sources of information in regard to school-gymnastics, in the interest of this work we visited Germany and Sweden to see the practical application of their respective systems in the schoolroom. While there is much that is good in the Swedish, with its scientific basis and systematic arrangement, and much that is good in the German, yet there is much good physical work not found in either. Ours are children of a nervous age. In many a schoolroom to-day, presided over by a nervous teacher, there is need for exercises which are soothing to the overwrought nerves of teacher and pupils. This is an element not found in either great system, and one which we think we have succeeded in including in our own.

It has seemed wise to us to select the best from all existing systems, changed, modified, and adapted to our peculiar needs. We have also added such general exercises for æsthetic culture as tend to refine the manners and create a love for the beautiful in form, voice, and movement. Our boys and girls are taught to stand well poised, to rise and sit with ease, to walk lightly and freely, and to move all parts of the body with ease and grace. Enough regular, systematic all-over exercise is given to counteract the evil effects of long confinement in one position.

While we do not claim to have a special system in the city of Washington, yet our work is thoroughly systematic. In all our work we have endeavored to meet the following requirements :—

1. It should be based on physiological law.
2. It should aim to secure a good carriage, regular development, and aid in securing to each pupil his maximum growth.
3. The whole should be a unit or an entirety, with dependent parts joined for definite purposes.
4. The parts should be sequential, proceeding from the simple to the complex, and aiming at definite and related results as the work advances.
5. It should be graded, adapted to the age of the child.

The first requisite, its basis on physiological facts, is all important in a scientific system of physical culture. It has been our aim to avoid desultory gymnastic work. Indeterminate movements have no educational value either from the standpoint of health or of development.

It has been our purpose to plan a training which will give the child a good carriage and a symmetrical development, one which secures that elasticity necessary for gracefulness, and such control over muscle and movement as will enable him to make the best use of his body in everyday life.

Suitable exercises having been chosen, we divided them according to difficulty, to correspond with certain groups of our eight grades. The divisions at present are between the second and third, and fifth and sixth grades, making three groups. A closer division has not been attempted, since up to the present time the higher grades have needed many of the simpler exercises given in lower grades. In the first and second years, little more than play work is attempted, involving, however, the necessary preparation for the regular educational gymnastics of the third grade.

The exercises lead from the simple to the complex. One exercise often forms a basis for another which is to be given in the following lesson. Later in the year simple exercises are combined. Thus the year's work by progression makes a connected whole, one part being dependent on another.

In our lessons, each part of the body in turn receives attention. Accordingly, having made a general grouping into trunk, head, arm, leg, breathing, and voice exercise, we chose one from each of these. In this way groups of muscles rest and work alternately. Thus is weariness avoided.

As the work is now planned, each child in the public schools of Washington, and also in the District of Columbia with the exception of a few children in isolated schools, is daily drilled by the regular teacher, in exercises which have been well taught previously by the special teacher of physical training. This means that a school attendance of 28,000 children is being exercised daily, for a period averaging from fifteen to twenty minutes. In this daily lesson each part of the body is used in turn, so that, at the end, the entire body has been exercised.

At the present time we have four special teachers of physical culture. With this corps we are able to visit each school and give a new lesson to each class once in every twenty school days. These special teachers meet once a week to report on the progress of the work and to discuss all subjects pertaining to physical training.

This year the regular teachers have been further assisted by printed lesson sheets containing full directions for the exercises given to the pupils under their observation by the special teachers.

Next year we propose to have printed a manual showing the work in its entirety. The exercises as planned will be divided into four groups, each representing two years of school work (corresponding with the first and second, third and fourth, fifth and sixth, and seventh and eighth grades). Thus the future eighth grade boy will not be doing the simpler exercises given in the fifth grade.

In the future we hope to secure separate rooms or halls set apart for gymnastic work. Only then can the best physical development be secured for our children.

School gymnastics form a distinct branch of the great subject of physical education. It is a department which requires not only a broad knowledge of physical culture in general, but special training is necessary in order to secure the best results. The teacher of school gymnastics must study them from an educational standpoint; must know their place in the great scheme of school instruction; must consider them in relation to all other departments of school work, notably manual training, sewing, and cooking. He must have special knowledge of child-life, of child-mind; must know how to reach the intelligence and sustain the interest of children.

A good gymnasium instructor is not necessarily a good schoolroom instructor of gymnastics. We believe that our future best special teachers of school gymnastics will come from the ranks of the regular school teachers, and from the normal schools of the country. A knowledge of psychology and of the best methods of presenting new truths to children is as important as is knowledge of a system of exercises. We have seen regular school teachers do work in leading their classes which would put to shame the work of some trained gymnastic teachers. A good system of exercise is indeed necessary, but so also is good teaching necessary.

Few towns or cities in the country will be able to pay for a special teacher of physical culture for each building. In most towns wherever physical culture is introduced, the regular teacher will have to give the daily drill. The success of the work as a whole will depend upon the individual work of each teacher. The knowledge of the teacher, and his ability to inspire interest in the children, determine the results. In this respect we have been most fortunate. To the regular teachers do we give the credit. Frequently the best work is seen, and most interest manifested, in parts of the city where the school element is below the average. This has been most gratifying when we consider that it is such children who are most in need of body training.

While we may differ from most cities in our method of physical training, and while we know that there is much room for improvement, yet we feel that, judging from the results already obtained, we are working in the right direction for the future good of our children.

REPORT OF PHYSICAL CULTURE IN THE PUBLIC SCHOOLS OF CHICAGO.

BY HENRY SUDER,

SUPERINTENDENT OF PHYSICAL CULTURE.

In 1885, members of the board of education and leading members of the Chicago Turngemeinde made a successful effort to have physical training form a part of the public school curriculum.

In June an exhibition of free gymnastics by pupils of the Chicago Turngemeinde was given in the Ogden School, to which the members of the board were invited. In the following October at a meeting of the board, it was decided to introduce physical culture into four grammar schools as a trial. It proved successful and was finally introduced into all the grammar schools, under the direction of a superintendent and eight assistants. Principals and teachers had long seen the need, and desired its introduction. Principals and teachers of the primary department, not wishing to be deprived of its benefits, asked for its introduction into the primary department. By a unanimous vote of the board, it was introduced into the primary department and extended to the high schools. At the present time the pupils from the infant to the senior class in the high school are enjoying the benefits of physical culture. This department is under the direction of a superintendent and twenty-four male assistants, of whom three are employed in high schools, twenty-one in grammar and primary schools. The primary schools are visited twice a month by the special teacher, who conducts the exercises in the different class rooms and gives the class room teachers the desired information and instructions concerning the exercises which she will conduct during his absence. The grammar schools are visited twice a week and the high schools once a week. Each class room teacher is provided with a systematized course of exercises.

In the Chicago schools there are eight grades, of which four are primary and four are grammar grades. For each grade exercises are prepared. In the primary grades simple arm, trunk, foot, and some marching exercises are practiced. The pupils in the grammar grades execute, besides simple and compound exercises, also movements with wooden wands. In schools with halls or large corridors the exercises are practiced mostly there, otherwise in the class room. In the high schools dumb-bells and Indian clubs are also used. At one of the new high school buildings a gymnasium 40 x 90 feet is erected. The pupils of this school will practice both light and heavy gymnastics, under the supervision of a special teacher.

Physical culture in our schools during the last six years has been in a general way very gratifying. It has met with the approval of parents, teachers, and pupils.

REPORT OF PHYSICAL CULTURE IN THE PUBLIC SCHOOLS OF SACRAMENTO, CAL.

Physical culture has never been systematically taught in the public schools of Sacramento. "Spasmodic gymnastics" have been indulged in occasionally. Hedwig Malmstrom has been engaged to introduce the Ling system of physical gymnastics, the experiment to be tried for one year.

He has in his charge two of the grammar schools, and instructs about 800 pupils, each class receiving a daily lesson of fifteen minutes. The time is necessarily limited, but much has been accomplished so far. The pupils seem to be interested, and have improved greatly. The teachers of the various classes under his instruction have been of invaluable assistance in making the work lighter.

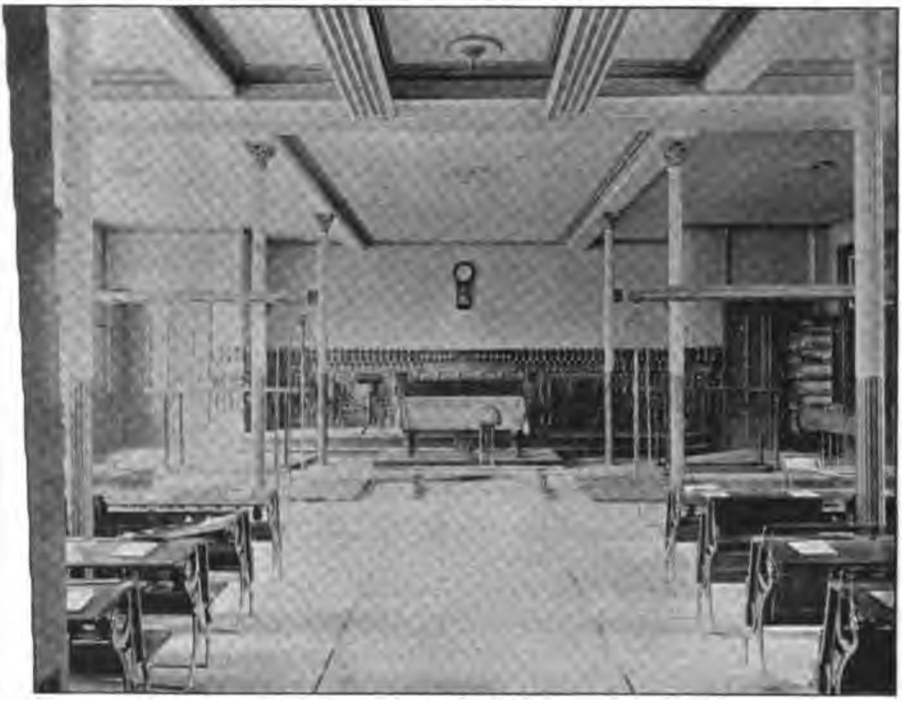
Previous to this there was no apparatus or gymnasium connected with the schools, but the Board of Education being anxious to have the work successful has fitted up one of the schools with some very good apparatus.

There is now a movement on foot to have the German system introduced in the public schools, and it will be determined at the close of the school year in July which is to be the favored system, but it is safe to say that the Ling system of physical gymnastics, which is being taught, is daily gaining popularity with pupils, teachers, and the public generally.

REPORT ON PHYSICAL EDUCATION IN THE PUBLIC SCHOOLS OF THE CITY OF NEW YORK.

BY J. GARDNER SMITH, M.D.

Considering the size and prominence of New York city, the training and education of the body has been, and is, behind the times. The subject has been under discussion for several years by the Board of Education, who have waited for some scheme which should be sufficiently comprehensive and practical for this great cosmopolitan city.



THE FIRST GYMNASIUM FITTED BY THE BOARD OF EDUCATION IN NEW YORK PUBLIC SCHOOLS. FITTED MARCH, 1892.

After hearing the discussions and papers of the American Association for the Advancement of Physical Education at Boston in the spring of 1890, a scheme was proposed which the Board of Education adopted as the beginning of this great work. The appropriation which had already been made for the year was used in introducing the work in five primary and three grammar departments in different parts of the city. The cut shows the first school fitted with apparatus, March, 1892. The system adopted comprised education, recreation, discipline, and other elements which tend to develop an all-round man or woman. The system is founded on the principles of anatomy, physiology, hygiene, and psychology, and may be termed the American system. We do not confine ourselves to any one series of exercises done in one particular way for any one particular object, but try to make the work broad and adapted to the needs of the scholars and location and arrangements of the rooms used for the purpose. The German, Swedish, and Delsarte exercises are used as needs and conditions require. Possibly more of the German work is used than any other, for this system seems to be the most comprehensive. It is our aim to make the work so interesting to the scholars that they will long for the hours of exercise to come, and thus far we may safely say that we have been successful, at least in this point.

The plan of teaching has been for the special instructor to visit each school once per week, spending sufficient time to give each class one or more new exercises and criticise the work of the past week which the teacher has carried on. At first the same series of work was carried throughout the school, no apparatus being used. This occupied the first term. The work consisted of the United States setting up drill, modified so that it could be practiced in the class rooms to music. With this breathing exercises were taught and where practicable a stationary run was introduced. This has proven a very popular way of introducing the work.

At the beginning of the second term a new series of exercises called "Calisthenic Drill, No. 2," was introduced in a similar manner, the lowest primary grade still practicing the first series. By the middle of the second term a scheme of graded work was introduced which has proven very attractive to both teachers and scholars.

This graded work consists of an Indian club drill for the first and second grammar grades, this drill being more complicated and requiring more thought, for which at this stage in the school year this class is best prepared. For the third and fourth grammar grades a bell bar drill has been introduced, based upon Major Barnjum's drill, and requiring less thought than the clubs, but more than the drills of the lower grades. The fifth and sixth grammar grades are pursuing wood dumb bell drill No. 2, based on the Roberts dumb bell drill and like all the drills arranged to music. The seventh and eighth grammar grades have a dumb bell drill No. 1, which requires less strength and is adapted to the conditions of the lower grades.

The first grade in the primary department is taught an easy Indian club drill. The second grade in the primary takes wood dumb bell drill No. 5, called the anvil chorus. The third grade uses the short wands in a drill which is less difficult than the bell bar drill of the grammar department. The fourth grade practices wood dumb bell drill No. 6. The fifth grade uses the rings, and the sixth grade practices free calisthenic exercises. All the grades are drilled in breathing exercises and free gymnastics that will expand and develop the chest.

It will be apparent to those who study these various drills that in grading the work we have considered muscular strength of the individual and the ability of the child to comprehend the exercises. It is our plan also to arrange and grade the work so that when the scholar leaves the grammar school he will be systematically developed, with a good chest capacity, and have complete control of his muscles. Thus gymnastics can be used in the education of the children, for I believe all will agree that the mind is to a large extent educated by the use of the voluntary muscles.

Besides these lighter forms of gymnastic work the schools are supplied with heavy apparatus consisting of parallel bars, horizontal bar, vaulting bar, horse, buck, ladders, chest bars, and jumping stand. You can see that the work is new, but if the experience of the first year is any criterion of the future we may safely expect that the work will grow.

It is the plan of the Board of Education to introduce physical culture into the schools as rapidly as finances and accommodations will permit. One element in our work which it seems to me is very important is the physical examination of scholars. We have compiled a chart which has been printed comprising certain measurements and points of information that will be valuable in compiling statistics. The instructor in physical exercises also records the condition of the heart, lungs, chest, back, abdomen, joints, and general health. It will not be possible at present to examine every scholar, but as fast as practicable we hope to be able to record the measurements and conditions of the majority. It has been upon the conditions of the scholars that we have based our work. By the physical examination, and that only, can one decide which scholars should not participate in the drill, and which should have special exercise prescribed. We shall endeavor to adapt the exercises to the needs of the individual scholar and not adapt the scholar to any particular plan or system. I believe that those who are directing physical culture should spend more time in the study of anatomy, physiology, hygiene, and psychology, and the needs of the children under their care, and think less of any one so-called system of physical education.

As this goes to press we know that the work has been introduced in twelve grammar and primary schools; a second instructor has been appointed and the work is progressing favorably.

THE NORMAL SCHOOL OF THE N. A. GYMNASTIC UNION.

BY W. A. STECHER.

This seminary for the training of teachers of gymnastics is situated at Milwaukee, Wis. The school building is owned by the Turnerbund (Gymnastic Union), cost $50,000, and is fitted up in a first-class manner. The building contains a gymnasium, two large lecture rooms, a fencing hall, dressing and bath rooms for both sexes, and a room for the director. This building is built alongside of and connected with the school of the German-American Teachers' Seminary.

Our normal school is incorporated under the laws of the State of Wisconsin and is governed by a board of five directors. The students of the teachers' seminary and of our normal school are taught by the same corps of instructors. Mr. George Brosius is director of our normal school, and Mr. Emil Dapprich is director of the German-American Academy.

The faculty and their branches of instruction are as follows:—

Mr. George Brosius, Gymnastics—practice and theory.

Mr. Emil Dapprich, Pedagogy, Physiology, Natural Science.

Dr. F. Mueller, Anatomy, Physiology, and Applied Gymnastics.

Mr. G. A. Schlafle, the History, Literature, and Methods of Gymnastics.

Mrs. Helen E. Bateman, English Language and Literature.

Miss Emma Wiegand, German Language and Literature.

Mr. Oscar Burckhardt, History with special reference to bodily development.

Mr. Karl Bruck, Fencing—preliminary lessons.

Mr. George Hintz, Fencing in all its branches.

Mr. Julius Rohn, Swimming—practice and theory.

Mr. G. A. Huebner, Music—vocal and instrumental.

The course of study lasts one year, from September first to the end of August. If the applicants for admission are members of a society belonging to the "Bund" they pay no tuition fee. Others pay a fee of $100. To be admitted to the school, an applicant must pass a satisfactory preliminary examination before a commission appointed by the authorities of the district in which he resides. The object of this examination is to ascertain the intellectual and physical standard of the applicant. The commission reporting favorably, they send the examination papers to Milwaukee, and here the applicant is again examined before being admitted into the school. The result is, that anyone admitted has shown himself to be an intelligent person, and has also shown that practically he has mastered all bodily exercises that are of primary importance, so that no time is lost in teaching him those.

To enable promising but poor students to enter the school, the national executive committee of the "Bund" has the power to advance a loan to those applicants who are reported worthy of it by the Milwaukee board of directors.

The "Bund" supports and upholds this school mainly for the purpose of supplying its societies with competent teachers. The directors of the institution are at present discussing the advisability of lengthening the course from one to two years. The biennial convention of the "Bund," to be held at Washington, D. C., this coming June, will also inquire into the advisability of arranging a summer course of five to six weeks for teachers that would like to gain an insight into the German system of gymnastics.

The aim of this school for teachers of physical training is to educate its scholars (both male and female) theoretically and practically so as to not only fit them to teach gymnastics, but also to enable them to intelligently influence the moral and intellectual development of the scholars under their charge. Secondly, to render them competent to exert a healthful influence upon their societies.

This is to be accomplished by systematic instruction in the following sciences :—

1. Practical gymnastics, Terminology of gymnastics, History of gymnastic appliances, Aims of bodily exercises, Plans of instruction for successive grades.
2. History of the development, system, method, and literature of all known bodily exercises with special reference to modern times.
3. History of gymnastics and mankind.
4. Anatomy and Physiology.
5. Dietetics, Hygiene, Corrective and Applied Gymnastics.
4. Pedagogics.
7. German and English Language and Literature.
8. Music.
9. Foil ; Sword and Bayonet fencing.
10. Swimming.

Examinations are held quarterly, and the results are made known to each student separately, so that he may see where extra work is needed. The closing examinations usually last four days, and are held in the presence of a commission appointed for this purpose by the national executive committee of the "Bund." Scholars passing this final examination satisfactorily receive diplomas which state that they possess the qualifications as teachers of gymnastics of the first or second grade.

The next subject on the programme was then taken up: "What constitutes a rational and a practical course of professional training for directors and teachers of physical training;" "Public and private normal schools," by Dr. C. E. Ehinger, West Chester Normal School, Pa.; "Summer and Y. M. C. A. Schools and Gymnasiums," by Dr. W. G. Anderson, Brooklyn; "Colleges and Universities," by Dr. G. W. Fitz, Cambridge, Mass.

DR. C. E. EHINGER: Physical culture has come to stay. It is only a question of time when the subject of physical training must be brought up in every city in the land. I think we hardly appreciate how much has been done by the Drexel Institute in this direction. An institution of this character has seen fit to invite this association to meet here and enjoy the courtesies which have been extended. It is a significant fact that such an institution should have established a department of physical culture. It has put physical culture on a par with all the other departments, and this department has been given the same support and the same encouragement with the departments of art, industry, and education in other branches.

Now as to the point of physical education in the normal schools. I think if we are to hasten the matter of education in this direction in the schools of the country we must urge it on the teachers. It is through the teachers we can accomplish the most work. We must look to this field for the greatest results. The introduction of physical training into the normal schools has been tried to some extent, and it has proved to my certain knowledge satisfactory, but it is too early to speak positively. I think I may say for the West Chester, Pa., Normal School that it is pre-eminently *the* place for introducing the subject of physical training. If this is brought to the mind of the teachers of the land, and they are in some degree fitted to impart instruction, the introduction into the general schools will not be so tardy and so imperfect. I think it is not so much a question of this system or that as it is a question of *some* system. The important fact is that we want to introduce physical education into the schools. I believe it can be successfully done by the Swedish system ; I believe it can be successfully done by the German system ; I believe it can be successfully done by a method which partakes of both. What we want is thorough work. We have placed too much stress upon the name. I began my work with the German turners, and I am proud to say I am still a member of that association. I have also enjoyed the privilege of instruction under Dr. Enebuske, and I believe that the system which he advocates offers more for certain phases of education than any other, but, as I said before, the important thing is not the system, but *a* system and thoroughness of work.

PHYSICAL CULTURE IN NORMAL SCHOOLS.

BY DR. C. E. EHINGER.

It seems quite strange, indeed, that at this day and age it should be necessary to advance arguments in favor of physical education, but there is to be seen on all sides such a lamentable neglect and dense ignorance of this subject as to call for a vigorous crusade in behalf of the education of our physical being. It is not, I think, necessary, however, to make a plea of this kind before an audience such as is gathered here to-day. I take it for granted that anyone who has interest enough in the cause to attend these meetings requires no proof of this great need. The question of importance is not so much, Do we need physical education ? but, How can we best secure it ? Progressive educators in all quarters are now giving the subject an amount of thought and expression which a few years ago would have rendered them subjects of ridicule, and led to their being classed as cranks. To my mind 'tis only a question of time when physical culture will be a recognized branch in every school in our land. The examples already set by the public schools of Boston, Chicago, St. Louis, Kansas City, Cleveland, Milwaukee, and Indianapolis, and more recently in New York city, and a score of other places, not to speak of the universities, colleges, academies, and private schools, will in the course of a few years be followed by most of the larger cities and many of the towns throughout our country. In the larger cities special teachers of this branch will be employed, either directly to instruct the children or so to train the regular teachers as properly to fit them to impart the needed instruction. But even in the larger cities such a great reform must necessarily come somewhat slowly, and in the smaller places and country districts the introduction of gymnastics by specially prepared teachers is exceedingly remote, if indeed it can ever be accomplished.

If physical education is to enter at all into the curriculum of these schools, it must be through the teacher of the regular branches. This I think will be conceded by all who have studied the problem. If, then, this conclusion is a proper one, the question resolves itself into, "What is the best method of reaching the regular teachers?" What more fitting place to commence the systematic teaching of gymnastics than the normal schools which are preparing the future teachers? It seems to me that the normal schools are pre-eminently the most suitable places in which to commence this great movement, and it is to them we must look for some of our greatest results in the future.

To those who are familiar with the methods employed at the normal schools, and the subjects pursued, the query will at once arise, How much can be done to prepare our students to teach gymnastics, and can the *time* be found in the already crowded curriculum to equip them properly? I reply that it *can* and *will.*

I do not think it is the function of the normal school to prepare special teachers of gymnastics, but believe that every normal school in the country can and should so instruct its graduates as to fit them to give instruction systematically to pupils of various ages in some rational course of free gymnastics. This is quite possible, and is such a crying need that I believe it will become an established fact before many more years have elapsed.

My acquaintance with the normal schools of the country is somewhat limited, but I know that in our own state of Pennsylvania several of the normal schools have already introduced departments of physical education, and we have with us to-day a representative of a prominent normal school in the West (Cook County Normal School, Chicago, Ill.), which has a well conducted department of physical education. I cannot say how much time has been given in these institutions to preparing their students to *teach* gymnastics, but I believe that several either have or will make some requirements of this kind of all graduates.

Last year, at the West Chester State Normal School, senior students, in addition to the regular work in the gymnasium, which is compulsory with all students, were required to attend for a certain portion of the year the class drills of the model school pupils, and all were given the opportunity to lead the classes, under the supervision of the instructors. In future it is expected that more time will be allotted to this work, and the students still better prepared to conduct class work in gymnastics. Thus far no attempt has been made to give instruction in the theory of gymnastics or the physiological effects of exercise, other than what came under the regular course of physiology; it is planned, however, to give the senior students a course of lectures upon these and kindred subjects.

The thing which we should especially strive for now is to secure for physical education that recognition and support which it so well deserves; to see that it is placed on an equal footing with other departments of education, for there is, I am sorry to say, some tendency to make it a kind of fad, and to introduce it into schools because it is the fashion of the hour, rather than because its value and need are fully comprehended. Not a little harm has already been done by such ill-advised attempts to introduce the work. If the subject is worthy the attention which educators are now giving it,—and the results already amply justify such a conclusion,—it should be accorded a prominence and support second to no other department, and in return for such support the same qualifications and high standard of acquirements should be exacted from its directors as is expected from the heads of other leading departments.

No better example could be produced of the opinion which prominent educators entertain on this subject than our presence here to-day in Drexel Institute. It is a matter of no little significance that a great educational institution like this, a leader in "the new education," should have seen fit to honor our association with an invitation to hold its seventh annual meeting in this magnificent auditorium. The Drexel Institute of Art, Science, and Industry has set an example in this movement which is well worthy of emulation. In the plans outlined by this institution a department of this kind has been established which is put upon a par with that of art or science, and accorded the same standing and support. The association, and the cause of physical education in general, is to be congratulated on such a recognition and advance. Drexel Institute has done more than establish a department of physical education with the avowed object of looking after the physical welfare of its students, while they are connected with the institution ; it has foreshadowed the particular question that I have been invited to discuss, and contemplates a normal department for the training of teachers of physical education. I need hardly add that such facts augur well for the future of the cause.

The normal schools possess peculiar advantages for preparing teachers in the elements of gymnastics. I believe that most, if not all, of the normal schools have connected with them model departments, wherein children from the youngest school age to that of about sixteen years of age are admitted. It is in this department that the senior students are given practical work in teaching, being required to conduct classes under the supervision of the heads of the department. So it will be seen that the best opportunities are afforded both to illustrate the methods and effects of physical training, and to accustom students to handling children in class drill. Think how much would be added to a teacher's value and influence if he could properly look after the physical well-being of the children who are placed in his charge. I am convinced that it would be a potent influence in controlling the pupils and making school life not only more profitable, but more agreeable. The disciplinary value of a well regulated drill can hardly be overestimated.

Some two months ago I visited Boston for the purpose of inspecting the gymnastic work in the public schools. A number of schools in different quarters of the city were visited, and the regular work was seen in all the grades from the lowest to the girls' high school. In one school in the older quarter of Boston the boys and girls were almost entirely of foreign parentage, mainly Italians and Russian Jews. I here witnessed the novel sight of a large room full of boys, none of whom had been in this country over two months, taking gymnastic drill to the command of the teacher. Many of these little fellows were as ragged and ill-kempt as one could well imagine, but their perfect attention and painstaking effort properly to execute the commands were a pleasure to behold.

The teacher in charge of these boys was positive that the results of this work were already distinctly apparent in the carriage and movements of the boys. I may here remark that in Boston the Swedish system of gymnastics has been adopted, and the instruction in it is given by the regular teachers, who, at stated periods, are themselves drilled by the gymnastic directors. Any doubts that I may have had concerning the ability and feasibility of having the regular teachers give the gymnastic instruction were most effectually dispelled by what I saw during this visit, for in every instance the teachers seemed not only thoroughly interested but also well prepared. I was fully prepared to see a lack of interest on the part of the pupils and an inclination to go through with the work in a lackadaisical manner; in this I was agreeably disappointed. I questioned many of the teachers and they were unanimous in the praise of the work and asserted that without question the effects were plainly apparent in the physical bearing and condition of the students, and all asserted that the effect on the discipline of the school was excellent. Had I no other knowledge of gymnastic work and its effects than that derived from this visit, I think I should be prepared to assert the desirability and practicability of introducing gymnastics into our public schools.

I think one great mistake which has been often made is to look upon the gymnastic department as something distinct from the other departments and having but little in common with the so-called intellectual branches. I would protest against such notions as unnatural and harmful. The whole trend of modern education is toward natural and practical methods. It aims to cultivate *all* the faculties ; to bring the child into the most perfect harmony with its environment ; to prepare it to fight the battles of life on the mental, moral, and physical planes with equal vigor. To accomplish best this result it has been found that a study and utilization of the natural objects surrounding us is necessary. The growth of plants and animals, their habits and mutual influence ; a study of the human body and its actions ; the relation of the mental to physical states, and *vice versa*,—in short, our object is to study and mold the whole child, and fit him for contact with the realities of life. The true pedagogue finds the key to mental growth and development in studying the movements, attitudes, expressions, and the co-ordinating and inhibitory powers of the body. We should not forget that movements are the outcome of changes in the nerve centers, and that the centers which control mental and physical states are most closely allied.

The educational aspect of gymnastics has been too much neglected. If these exercises are properly selected, thoroughly learned, and sufficiently varied, the educational value is much greater than is generally supposed.

This department can work in the most perfect harmony with others ; it should supplement and exemplify the principles which govern educational methods, and no method should be tolerated in teaching this branch which would do violence to the recognized pedagogical canons. Nowhere can such ideas be better inculcated than in the normal school.

The question as to what is the best system of gymnastics for public school work is one which frequently arises. I am not disposed to quarrel with the advocates of the various "systems," believing that the leading ones all have their special merits. I believe that it is not so much a question as to whether we use this "system" or that "system" exclusively, but that *some system* be *systematically* employed. I would place more stress upon the thoroughness and care with which the work is given than upon the system. I know that the Swedish system is succeeding admirably in many quarters. I also know that the German system is giving most excellent results, and that it has not been given the credit which it deserves. I am equally certain that systems which partake of both and yet do not follow closely either of them are proving highly satisfactory. At the West Chester State Normal School we have used what, for want of a better name, has been called the American Eclectic System, in other words, we have drawn freely from the Swedish, German, American, and Delsarte systems, following the German system perhaps more closely than any other. It is our custom to make free use of gymnastic and dancing steps to musical accompaniment. We have had no regularly employed musician, and hence have not used music in all our classes. For two of our model classes we have piano accompaniment regularly, and for the other classes occasionally, when it is found convenient. So, working some classes with and others without music, we think we are in a position to judge something of the value of music as an accompaniment to gymnastics. While we do not consider it indispensable, it is unquestionably, in our opinion, a valuable adjunct, as it helps to keep up the interest in the work, renders it less tiresome, educates the sense of rhythm, and awakens and stimulates the musical taste of the children.

The limits of this paper preclude my going into further details, but will say in conclusion that our experience at the West Chester State Normal School warrants us in saying that gymnastics can be successfully introduced into normal school work, and that it is a field well worthy of cultivation.

COL. FRANCIS W. PARKER: The cause of physical culture in America owes very much—more than any words can tell—to the magnificent generosity of Mrs. Mary Hemenway, the earnest enthusiasm and executive ability of Miss Homans, and the marvelous skill of Dr. Enebuske. The great merit of the Boston Training School is, that by theory and superior practical work it has brought the question of physical training squarely before the people, and especially before the teachers of America. This grand convention is a convincing proof of this fact.

Some wise man has said that the greatest discovery of the nineteenth century is the "Suspended Judgment." Suspended judgment means a thorough, honest investigation of all theories, an investigation not handicapped by implicit belief, or burdened by bigoted dogmatism.

We are here to search for the best,—here in this convention,—and here on earth, for that divine purpose. Any suspicion that we have already found the best is unworthy of human reason. We accept with profound gratitude what the day has brought us, and will use our precious inheritance for future discoveries.

I have the honor to be a delegate of the Vor-Ort of the Turnerbund of America. I am only a delegate,—my esteemed colleagues, Mr. Werner Stecher, of St. Louis, and Karl Kroh, of Chicago, are both delegates and excellent representatives of German and American Turnen. I am not here to declare that the Turner system of physical culture is the best system in the world, or that any system or method is the best. My thesis is that all systems should be thoroughly studied and investigated, and, above all systems, the one which was born and nourished by the unrivaled pedagogical, educative spirit of German philosophers and teachers has the highest demand upon us. For this statement you will please allow me to give my reasons :—

One motive unites us, and that is, the development of the body is solely and entirely to make it the most perfect possible instrument of the soul in its two fundamental functions of attention and expression. We hold that any exercise or set of exercises of the body that does not directly re-act and enhance mind and soul power is unworthy of our consideration. The body perishes; the effects of the soul's action are everlasting. But mingled and entangled with this central educative motive have been and are many other inferior motives. These unphilosophical motives may be summed up in a phrase,—physical exercises for the sake of physical strength and skill. Pure athletics, acrobatics, and military accomplishments are the motives that lie without the line of education. Our question is,—and there is no dissenting voice,—what is the pedagogical value of physical training? What are the relations of physical exercises to the brain and mind, and what are the best exercises to enhance the development of the whole being?

Of all nations, Germany has the first claim to anything like a science of education. In America, the science of education is still in the cradle, and the poor, puny child has very little substantial nourishment. Books upon education give us some indication of the growth of this science of sciences. Fifteen years ago, it was hard to find a book upon education in the heavily loaded shelves of our American bookstores. More books upon the subject of teaching have been published in English during the last ten years than in all the previous centuries. Germany to-day has more books upon any one of the main branches of education than we in America have on all of them. The names of celebrated German educators,—I have but to repeat them,—Comenius, Ratich, Sturm, Basedow, Pestalozzi, Diesterweg, Stoy, Ziller, Rein, and Froebel,—no other nation or all nations can present such a list of original thinkers and workers in the great field of education. German Turnen was born of the enthusiastic, philosophic spirit of German thought in education; it is the direct product of earnest, zealous, thoroughly educated German teachers; it sprang directly from the necessities of the schools, and the development of children, and has always been closely related to mental and moral growth. Every great name which the Germans delight to honor as a master spirit in Turnen is borne by a university educated, professionally trained teacher; a teacher of other subjects than gymnastics. Father Jahn was a famous sprachlehrer (a language teacher); Guts-muths was an excellent teacher; Pestalozzi was active in his support of physical culture; Harnisch has left a flattering record as a teacher; Massman was a school principal; Spiess and Langenthal were co-workers with Froebel in Burgdorf. These teachers who have left us great names on the honored roll of pedagogues were philanthropins,—and here I must refer to our honored President's address.

Sounding like a voice from the tombs, he quotes Niethammer (an almost forgotten name of the last century) in regard to the difference between the humanists and philanthropins. If I remember right, this is the quotation: "1.

Humanism aims at general culture; philanthropinism, at utility. 2. Humanism seeks to exercise and strengthen the mind; philanthropinism, to fill it with useful knowledge. 3. Humanism demands but few subjects of study; philanthropinism, many. 4. Humanism exercises the mind with ideas; philanthropinism, with things. 5. Humanism deals with the true, the beautiful, and the good, the elements of human culture; philanthropinism, with matter. 6. Humanism finds subjects of study in classical antiquity; philanthropinism, in the present. 7. Humanism regards learning as a serious employment; philanthropinism makes it, as far as possible, an amusement. 8. Humanism leads to thoroughness in a few things; philanthropinism, to superficiality in many. 9. Humanism *cultivates the memory*, the repository of knowledge; philanthropinism, neglects it."

Dr. Hartwell has given us a glance back into the eighteenth century of educational thought. He has presented us with a specimen of the dying wail of the deposed idol, falsely named "Humanism." The change of opinion may be thus stated. It is refreshing to look back a hundred years and note the changes in opinion. 1. The humanists, following the traditions of our race, the Aryan, worshiped the shades and shadows of their ancestors; the philanthropins studied the demands of the times, evolved from the dark ages. 2. The humanists relied upon the grammar of dead languages as a sole means of exercising and strengthening the mind; the philanthropins brought the child in contact with the real world. 3. The humanists exercised the mind with Greek roots; the philanthropins, with roots of truth. 4. The humanists dealt with the facts of an ancient world; the philanthropins discovered that God revealed himself through matter as well as words. 6. Humanism finds its subjects in classical antiquity; philanthropinism, in the present (*necessities of progress*). 7. The humanists regarded learning as a serious employment, so serious that every Greek root was basted into the memory by the material used for straps, canes, and ferules; the philanthropins believed that true study, the discovery of God's eternal truth, is a joy, and its application a delight; the humanists believed in the child born in sin and iniquity; the philanthropins believed in every child as a type of the Divine One born on the hills of Bethlehem. 8. The humanists confined study to dogmatic assertions and its resulting mental slavery ; the purpose of the philanthropins was human freedom. 9. The humanists cultivated verbal memory ; the philanthropins. reasoning power. Look down the century through which this curious relic comes to us. What humanist remains on the roll of celebrated teachers ? Not one ! What text-book written by a humanist is used as an exemplar in any fragment anyway, of to-day ? The methods which all true and good teachers are struggling to abolish.

Whatever, then, is progressive to-day, whatever, then, is stimulating to renewed study of our divine art, came from the earnest, honest, child-loving, self-sacrificing philanthropins. Here are the men, though not in name ranked as philanthropins, they had the spirit of these lovers of mankind,—Comenius, Basedow, Pestalozzi, Diesterweg, Froebel, —the latter name suggests the highest point that this noble school of educators has yet attained. Froebel sums up the difference between the old schoolmaster and the new : the old said to his pupils. "Here am I, the incarnated truth, learn what I know and learn it as I have learned it. Follow me, be like me." The new says, "With your hand in mine, I will try to point the way to the Invisible Third, the everlasting truth. Come with me."

I beg your pardon for detaining you upon this point so long ; but it seems to me to be directly pertinent to the subject in hand. Every proposition of a fixed and rounded method of teaching suggests an alarming suspicion as to its validity. A method of education is the adaptation of knowledge and exercise to the development of the whole being. A fixed method suggests that the being, body, mind, and soul, is thoroughly known, and that all knowledge and all conditions of growth are also known, and that the true method is also known,—a presumption too monstrous to be entertained for a moment by a reasonable being. German Turnen is not a method,—it never had *one* discoverer or inventor; it has had hundreds of great educators as its devoted students and contributors. Every Turner recognizes that every step in progress is merely tentative. It has a full literature ; an enunciation of principles, and countless details of an ever-growing method. Its one claim is that it is the honest growth of eighty years of earnest, thoughtful work of minds consecrated to the development of the whole being; its claim is that this marvelous evolution, which has had the ardent support of all the great German philosophers, of whom the world-famed Virchow and Du Bois Raymond are now living, should be carefully and thoroughly studied, and applied when found good and true. If the sole purpose of gymnastics is pedagogical, what educators are best informed as to what is pedagogical? Truly those educators only who have studied and practiced the science of education.

German Turnen is a system of perpetual research and perpetual progress; it appeals to genuine students. There is a marvelous fascination to the average mind and the great majority of people in a fixed and complete method, of whatever nature. A fixed method as propaganda has immense advantages over a method that is ever moving on towards the better and the best. The human soul seeks for the ultimate in the present, and worships this fancied product as a pagan idol. "*Tell me what, how, and where, and I will follow," is the prayer of the spiritual descendants of the humanists.* "Teach me the principles and I will find a tentative method," is the motto of the progressive teacher.

I regretted that our great teacher in physical culture, Baron Enebuske, allowed a trace of the "last argument" ridicule to appear in his otherwise logical presentation. The reference to the "picnic" has a humanistic flavor. It is true the German Turners have a profound belief in arousing joy and delight in physical exercises in plays and games, and this is a direct inference from the results of all true study, which is the striving and struggling to know the truth, and that struggle is full of intense delight. As the fresh blood aroused by normal physical exercise enlivens and invigorates the whole body, filling the mind with happy emotions, so, in a far higher way, the striving of divine energy through the soul brings a culmination of delight. The humanists would have us believe that severe prolonged exertion should be accompanied by pain, sorrow, and the strap; the philanthropins believe that the most prolonged exertions of both body and mind in natural lines are a perennial source of pleasure.

Of all beings on the face of the earth, we Americans are in imminent need of the gospel of healthy, hearty play and fun. The strain of continual work is slaying its thousands. The test of all exercise is enthusiasm that springs from healthy growth. But our honored friend carried his fun a little too far when he referred to the national peculiarities of the Germans. The question for us to decide is, in matters of true socialism and rational religion, are we moving towards the liberty loving German ideals, or are they moving towards us? For further study, I would respectfully refer you to the Higher Criticism.

German Turnen in America, it is true, was born in a terrible struggle for human rights; '48 tells the story. But the story of the influence of German Turnen in America upon our welfare and progress has not yet been told. I have time only to relate one incident. The greatest of all orators of this century threw himself into the breach, almost single-handed and alone, for human liberty. We can scarcely believe to-day how our great modern Athens with its wealth of culture and refinement frowned down and even ostracized Wendell Phillips, when he heroically sought to shake off the fetters from the slave. You remember the oft-repeated story,—how in classic Boston with its wealth and culture, the people rose in a mighty wrath against the intruder upon the so-called Divine Rights; how he stood in Faneuil Hall and spoke against a surging mob of wrathful citizens; how night after night his wonderful eloquence sang the song of freedom for the downtrodden slave, and how great mobs of roughs and rowdies, doing the behests of culture and refinement, covered him, as he stood in his sublime dignity, with the filth of the street.

One picture our own Mrs. Livermore has painted. The great hall was crowded; in the rear of the hall was a mass of roughs gathered from the slums of the street, who had promised to shut the mouth of the marvelous orator. First, they covered the stage with rotten eggs, cabbages, and the missiles used on such occasions, then they advanced down the aisle to tear Wendell Phillips from the stage; but halt! Quietly, there had sat in the front rows a little crowd of men whose firm set teeth and grave countenances told that they had a work to do. They rose, as the mob moved down the aisles, as one man, filed out, and drew from their pockets their revolvers. "Back!" they cry, "back! back!" and that was an argument which the ruffians understood, and back they went; step by step, at the muzzles of the unwavering pistols, back out of the aisles into the corridors, back out into the street, and the first victory over ruffianism of the old civilization that protected slavery was accomplished. Then these same men surrounded the sublime orator and marched in closed ranks around him to his home, where he bade them good night and uttered the prophecy that those same ruffians who had mobbed him would soon toss their dirty caps in the air in his honor.

These men who were in the vanguard of liberty were, my friends, German Turners, trained by pupils of Jahn and Spiess. Such national peculiarities we can admire when we know them. I have not time to tell the story of the brave Captain Lyon of St. Louis, how with German Turners he turned the tide and saved Missouri for the Union, or, of the riots in Cincinnati where the Turners stood bravely on the Union side, or of their brave fightings all through the great Civil War, led by Schurz, Sigel, and Heintzelman.

When history is written, it will place high in the list of battles and wars for the holy cause of liberty, the fight of the German schoolmaster for freedom, and in that battle the doctrine, *mens sana in corpore sano*, stood foremost as a Schlagwort.

I simply ask you, members of this association, to study German Turnen before you finally decide what is the best method.

Dr. W. G. Anderson: In representing the summer normal schools for the training of teachers of gymnastics, I do not feel that I am in a position to speak positively of schools other than those with which I am connected, but I believe the directors of these short term institutions are present and able to speak in their own behalf.

Of the objections which I have heard against these schools, the most serious one seems to be that the course of training is too short to produce good results. If, at the meeting of this American Association, which lasts but two days, and which many of us come hundreds of miles to attend, we are able to gain in experience and knowledge, and I believe you will admit we do, is it not true that in six weeks pupils who give five hours per day five days in the week to the subject of physical training can be benefited?

At the summer school there is an opportunity to exchange opinions, to compare notes, to come in contact with different teachers and experts in each branch, and to notice the various methods of teaching which are in use. It is possible in five minutes for a person to get an idea that will be of great value to him through life. To my mind it is possible for men and women to gain a great deal of valuable experience in six weeks' hard work.

Fault has been found with the Chautauqua school for issuing a diploma. As the head of this school, let me state that we do not now nor have we ever issued diplomas to those taking either the full or partial course. We give certificates, which merely state that members of the normal class have done a certain amount of work. But these papers do not even carry with them the indorsement of the school.

We try to place the summer school of gymnastics on a broad, liberal, and withal a substantial platform. We are after the truth, we seek for that which will best meet all the physical requirements. We do not believe that such ends have yet been reached, but that they will be sometime. We believe that a system is valued by what it does in practice, by its actual results, not by how it sounds on paper. We believe that the present recognized methods hold much that is good; now, if these methods are represented by specialists, they will do their best to champion their own cause so that educated teachers by coming in contact with such heads of departments will be in a better position to judge of the merits of the different systems, and thus with the help of many we shall test these systems and come nearer the truth.

This being the case we teach Swedish, German, Delsarte, and the so-called American system. The directors of the various departments give all of their time to their specialties, and they have the good will and backing of the school. If a person wants to give his entire time to the study of Swedish gymnastics he can, and under the guidance of a native teacher. Should a young woman desire to make a specialty of Delsarte, she can give six hours a day to that one study, if it is to her mind to do so. Again, if the applicant is anxious to teach what, for lack of a better name, we term the eclectic system, we endeavor to outline work that will be suitable, profitable, and pleasant to her.

During the last seven years I have been in normal work I have found this to be the case: There are many teachers of gymnastics in this country who are making vigorous efforts to teach medical, educational, æsthetic, and military gymnastics. It is a positive fact that to-day there are a large number of teachers who are instructing the pupils in our land who cannot tell the difference between the Swedish and the German gymnastics, and who have a wrong idea of Delsarte.

It is an axiom that a person cannot teach what he does not know. If, at our summer schools, we can show these teachers that they are trying to do this very thing, I think we have helped the cause. It requires a life study for a man, or a woman, to thoroughly understand and teach medical gymnastics. It requires just as much time to properly comprehend and teach educational gymnastics. Now, for an inexperienced teacher to stand before a community and say, "I am a teacher of educational, medical, and æsthetic gymnastics, and know all the different systems," is absurd.

At the same time, let this ambitious teacher say, "I can equip gymnasiums and manufacture gymnastic apparatus," and he has claimed the (gymnastic) earth. We try to persuade our teachers to select one grade of work and make a specialty of that. It is well for the gymnastic teacher to "Know everything about something, and something about everything."

Another very important point to be considered is *how* to teach gymnastics. Does this seem too simple? Is it not an art to instruct? Have not the pedagogues for years been trying to find out *how* to educate, and are not the works on pedagogy legion? Now, of two teachers of gymnastics of equal physical and mental ability, the one who understands the science of teaching, or who knows *how* to impart knowledge to others, will succeed quicker than the one who does not. The summer school teaches how to teach.

To advance in this cause let us get rid of the bigoted man who says, " My system is the only one ; there is nothing good in any other ; I stand alone and am right, you are wrong ; I am not willing to investigate your methods, because they are not mine." I repeat, let us get rid of this man as soon as possible. He is found in every school of gymnastics in the country. We come across, in our dealings with people, a certain class who will pass judgment upon work, or upon schools, with which they are not acquainted. The man who has never investigated carefully the workings of summer schools, who has never even visited the community where they exist while in working order, is not, to my mind, competent to pass final judgment upon these institutions.

It is narrow to say that the Delsarte system combines all that should be taught ; or that the German system is complete and answers all the requirements, and that above these two stands the Swedish system of gymnastics, which cannot be approached by anything else because it is so complete. We believe in the Delsarte, German, and Swedish systems. We try to get the best from each of these, and we say to the special instructors, Do the best you can for your own system, and at the same time if you have the opportunity study the other systems, that you may be broader and more liberal in your methods of educating.

The Swedish system of gymnastics has done much for America. It has set us to thinking as we did not think before, and we find that in more respects than one we are on shaky ground. When the Swedes came to us with the question " why," we were not at all times ready to answer. I am a young man, and hardly in a position to act as a judge, but this is my opinion, that the Swedish theory has made a greater impression upon the educated American people than the German theory has. I do not say that the German theory is not convincing, but the Swedish has been presented to us as the German has not. On the other hand, I have found both at the winter and summer schools that the Swedish practice is not popular, and therefore is not so readily accepted by our pupils ; while the German practice, which has in it much more of the element of interest and variety combined with actual work, accomplishes more because it is interesting.

Every teacher in the hall knows the value of *interesting* pupils. The best results cannot be secured without it. We have not yet reached the time when we can say to our scholars, "You must take this whether you want to or not." We can say this about the "three R's," because our pupils' parents and grand parents and great grand parents were so trained. If the day comes when we can compel a child to do what we please, then we need pay no attention to the element of interest, but the wise educator in any branch endeavors to interest. This is taught at the summer school. We use and advocate music, and I am a believer in instrumental and vocal accompaniment to gymnastic work, as it aids and interests.

Again, of the three systems to which I have referred, namely, the German, Delsarte, and Swedish, if each will produce the same results, in some instances this is the case, why not adopt that which has the greatest element of interest in it?

I have heard enthusiastic devotees of the Swedish, German, and Delsarte systems say that they could not indorse certain good results seen in each other's work, because it was not their method. This is narrow, indeed. The Methodist might as well say that the Baptist can never get to heaven because he prefers going some other road, by water route, for example.

The advocates of Delsarte, Jahn, and Ling believe that grace and self-control are desirable and sure results of their work. Yet, I know that the so-called American system will produce these very results. Now, must I be so prejudiced that I can only strive for these ends by my system, just because I am an American? If I found that teaching the Ling system without music would give my pupils the self-control quicker, and at the same time be more interesting, I would teach that.

I am glad that Baron Posse has made the statement that the Swedes do use bells, wands, and the horizontal bar. This statement brings us into closer sympathy with their system.

As I said at the beginning of this talk, we stand on a liberal platform for this reason : Physical education in this country is too young for us to make the statement that we know now what is best and what is right, and I believe we should be liberal in our opinions until we have fairly tested what has been presented to us. The summer school may be likened to the room in which is tested the quality of instruments. Where there are so many different minds they must of course have a variety of opinions, an expression of which cannot but advance the cause. I am a strong believer in the summer school, not only in this with which I am connected, but also in the others, and one of the last bits of advice we give to the members of our normal class, both in Brooklyn and at Chautauqua, is this : "Attend as many of these schools as you can, in order that you may be in a better position to advance the cause of physical education."

If you will permit me I will refer to my own experience, and that is the last I shall say. I have found, as has been said before this morning, that the success in the gymnasium, and in the school, depends upon the teacher, and the personal magnetism of the teacher who does any work; when he teaches it is pleasure. If you look at this subject of physical training as it should be, it is work that is a pleasure and that is contagious. When you can go before a class of little children and make them happy and smile at their play you will succeed with them, but when you find them with their quiet eyes on the clock, glad when the time has come to go upstairs, you have failed.

I do not doubt what Mr. Posse has said about the Swedish system, and that he has broken down the barriers when he said that he would allow them to use anything, clubs, dumbbells, and I hope the time is not far distant when they will all be broken down, and all these barriers will be things of the past, and a broad field will be opened into which any educated man or woman can enter and it shall make them free.

MR. BOLIN: May I say a word ?

THE PRESIDENT: It seems to me out of order unless the gentleman desires to be heard later. I call on Dr. Fitz, instructor of hygiene in the Harvard University, to speak of the work pursued in the college course at Cornell and Harvard ; they have a four years' course in physical training.

Dr. Fitz: Members of the Association, I will not take up the time to go over the case presented by Harvard, and I know not enough of the course presented by Cornell to give any idea of it. The object of both courses as I understand it is this, to present teachers who are thoroughly trained in scientific methods of work, who have fundamental knowledge which will enable them to make successful teachers of physical training. The requirements of the teacher of the physical training school are not simply to be able to do floor work. There is a great need of special discussion on that subject and the people must be able to select out what they need and meet it. We hear much about the theory of physical training and the theory of different systems. What right have we to theories? Physiology has not reached the point where they can say deductively that this should be so and that otherwise. What is physiology doing? What stand does it take to-day? Look to Mosso and Lombard, the men who are perhaps doing advanced work in this line. They are studying, they are not saying what you shall do and what you shall not do; they are studying what is the best; they are studying those men who can best do these things; studying the conditions under which they may best do them. Physiology is being built up; it is not getting down deductively and prescribing a certain course. To claim any system to be based upon physiological grounds, then, is not justifiable. Physical training to-day is an art, not a science. It has pursued the same course with regard to knowledge that chemistry and physics have pursued. You have the first department of the art, then the study of the art as it exists, and the development of the science. To-day physical training stands in that relationship. As physiologists, we should study the conditions under which the exercises are done, and the results of these exercises upon the system. What we need is scientific work, not the assumption that certain laws require certain exercises; and so with the system of physical training, if what I have said is true, they have practically no significance. What we want is the clear scientific study of the physiology; the exercise, whether presented in one form or another. Let us see just what each exercise does for the human body, and just what portion of the body it affects and how much in justice we shall be able to say what exercises are best, and what are not so good. Probably no exercise is really harmful.

I, too, see the dawn of the day. That dawn or that day is not the part-acceptance of any so-called system, or influence of any personal prejudice towards that system. It will come when we have the equal study of physiology and physical training and the clear sifting out of what we have already furnished us by the art which has developed along different lines, the putting of those things together which are best, and the giving us a clear system which will give well formed bodies, strong bodies, and the power to use them gracefully.

THE PRESIDENT: I wait your pleasure. At this point there arises this question: whether this question should be thrown open to general discussion. Is it your pleasure that the discussion should be continued?

A vote being taken on the question the chair was unable to decide and asked for a show of hands, and declared that it was the sense of the convention that the discussion should be continued.

MR. ECHART: I would like to say one thing. If we would teach our children, the young children, it is to be able to speak intelligently, I do not see why we should not take this matter up in our convention. We have a big army of men going out from our higher schools and our colleges each year who do not know anything about physical education as a science or art, take it whichever way you please. I think it should be taught in every college. Take the number of young men and women going out every year from the higher schools and the colleges into this country; it is an army, it amounts to tens of thousands, and these people could do a great deal for us, because they are the coming people; they are the people who are going to rule the educational thought of the country; they are going into our school boards; our school boards are going to be made up of these very people, and these men are to say what is best for our common schools; and these men should be instructed in hygiene and physiology, not to make doctors of them, but to make them good citizens, so that they know how to take care of themselves, and take care of their families, and their neighbors round about them.

More than half the sickness in this country comes from neglect and ignorance of the sanitary laws rather than from a dispensation of Providence. I think I am myself able to state the fact in reference to the people dying from many diseases. Now, understanding this, are we not to do something? I think the burden rests upon us. When I see our college men who are going to make our doctors and our lawyers, and Swedish teachers, I think they should have a knowledge of the value of hygiene, and of physical education, and if we understand that fact we make a big advance. I think we have a place to begin work, and to do more work on this system than we ourselves as a body can accomplish, and if we would reach the masses we must begin with the colleges, those who are going to be the leaders of men.

THE PRESIDENT: I will announce the committee in charge of the auxiliary movement; there are four besides the president, E. M. Hartwell, chairman, Dr. D. A. Sargent, Mr. Karl Kroh, Dr. C. J. Enebuske, Dr. Lena V. Ingraham, of Boston.

I wish to say also that there is material that will not be thrown away, and proper reports will be made for most of the cities mentioned; Boston, New York, Washington, they are ready to report. We have a report in hand from Chicago, and another in from Kansas City, so that they will work in for the progress in public schools, and though it has not been discussed here in detail it will be spread upon the proceedings of this association.

MR. HALL: We have some resolutions here which I think are in order: *Resolved*, that this association tenders its sincere thanks to the managers of the Drexel Institute for the use of its magnificent building.

(The resolutions were handed to the president and adopted.)

DR. GULICK moved that the council of this association be authorized, if in its judgment it be feasible, to arrange sections and sectional meetings for the purpose of discussing special subjects.

(Carried.)

THE PRESIDENT: I should like to speak simply of the fact, those who are here for the first time and were on hand this afternoon,—I would call attention to the fact that all members of the association have been invited to avail themselves of the courtesies of the Athletic Schuylkill Club.

Now, then, I think the time has arrived, unless there is some other matter of business, for dissolving this meeting. The seventh annual meeting of the association is assuredly the largest, the most interesting, the most interested, and I venture to say in face of the matters that have been brought up here, and the questions we have been brought face to face with, that it is likely to be the most productive of good results. We should remember that we belong to a coming cause, and we should remember that many men of many different minds, and women also, are in it, and if we can contrive to go on, and come nearer and nearer together, and shoulder to shoulder, and manifest as much interest as has been shown here to-day in spite of radical differences, sectionalism, professional differences, that a hundred things have been suggested, and no one adopted, that something will come out of it that will suit the people and help each representative interest.

I pronounce the seventh annual meeting of the Association for the Advancement of Physical Education dissolved without day.

[Dr. Enebuske's paper appears here instead of in the body of the report for certain reasons which could not be avoided.—Ed.]

SOME MEASURABLE RESULTS OF SWEDISH PEDAGOGICAL GYMNASTICS.

Mr. Chairman, Ladies and Gentlemen: I wish to speak to you of some of the results of gymnastics that can be measured. I shall base my statements upon observations made upon twenty-six students of the Boston Normal School of Gymnastics, who were preparing to become teachers of gymnastics.*

When the first observations were made, the students had already had physical training, some for one year, others for more than a year, while still others had had only one month, and some of them no preceding training. The second observations were made seven months later. During this period all had had training, some of them four hours a week, the greater number five hours a week. The greater number of the students devoted all their time, during this period, to the theoretical and practical study of gymnastics. Besides, some of them devoted part of their time to teaching, and a smaller number held positions as public school teachers in Boston, and had their gymnastic exercises in the afternoon, after the close of the public schools. These students represent various ages from seventeen to forty-two. Consequently, the cases I am about to present to you do not represent any uniform condition as to age, previous training, or occupation. But the common feature is that *between the first and second measurements they had all had four or five hours' gymnastic exercises every week*, and in addition had done much work of various kinds, mostly of an intellectual nature.

In choosing my subject for this valuable hour, when I face leading men and women, representatives of the educational interests of the country, I have had three objects in view:—

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*The measurements were taken by Miss M. Anna Wood, of Wellesley College.

First, to elicit a discussion from those here present who have had a larger experience than I have had in applied anthropometry,—a discussion that may throw light upon subjects of great interest to us all.

Second, to call your attention to some deficiencies, according to my views, in the anthropometric method in vogue in our gymnasia,—deficiencies which, I think, might be remedied without much diffculty.

Third, to present an objective verification of some of the results of the method pursued.

Anthopometry is a science of interest in itself, and of practical application in many directions. Anthropometry in the gymnasium is, or should be, of direct use with reference to physical education. No country equals America in the display of eagerness to accumulate millions of anthropometric items, and the averages of the items are undergoing a steady process of refinement. But, while we are building upon the averages, would it not be wise sometimes to discuss the value of those averages with reference to physical training, taking it for granted that these averages are correct ?

These averages are of great interest in many respects. They keep us informed of partial conditions of the physique of society. They are building-stones for speculations by which we may climb to certain heights,—clear heights, if you please, but cold and lifeless. Therein is the disappointing feature of isolated averages, by themselves alone. They are disjointed, disintegrated, separate from real life. We may put together the averages of fifty items elicited from a million subjects, and by this process erect a figure that to some extent is the imitation, in outline, of a human being, but it is not a real man. It cannot be verified by living experiments within real life. It does not hear our questions. It cannot answer them. It is deaf and mute as the monument of an Egyptian god ; or, at most, it gazes at us with the melancholy expression of an Antinous, oppressed with wonder at its own existence.

The average of everything may be good, as a standard, for nothing individually ; or, more particularly, the averages of corresponding parts of all are not sure to be the standards for the development of the corresponding parts of any individual, because every individual has the standard of his development in his own measures alone. They determine each other mutually. To this topic I will devote the greater part of my discussion.

One of my objects, I have said, was to produce objective verification of some of the results of the method pursued. In comparing the two observations, it has been found that almost everywhere some change has taken place. Some of the numbers have grown larger, others smaller. Has this increase or decrease been a gain or a loss to the individual, —to any one of them or to all,—*i.e.*, has it been a gain in the sense of personal amelioration? The reply to this question is of the utmost importance; and, in view of the fact that the method of training that has been followed in these cases is rapidly gaining ground in the country, I am justified in anticipating the interest of many in this aspect of my subject.

The method pursued has been *the pedagogical gymnastics of the Ling System,* in its purity and simplicity, without any addition or alteration. When I began my study of the changes in measurements brought about by gymnastics, I found the subject widening at every step. One question answered, many new questions arose. I became impressed with the fact that I had entered a great, grand West of scientific investigation. The field being so large, I can give only an abstract of that which I have already gleaned from it.

I propose now, first, to give a summary review of some of the changes that have taken place in these students who have come under observation.

Second, to discuss particularly certain of the changes which have a bearing upon the capacity for work.

Third, and finally, to present a few general conclusions.

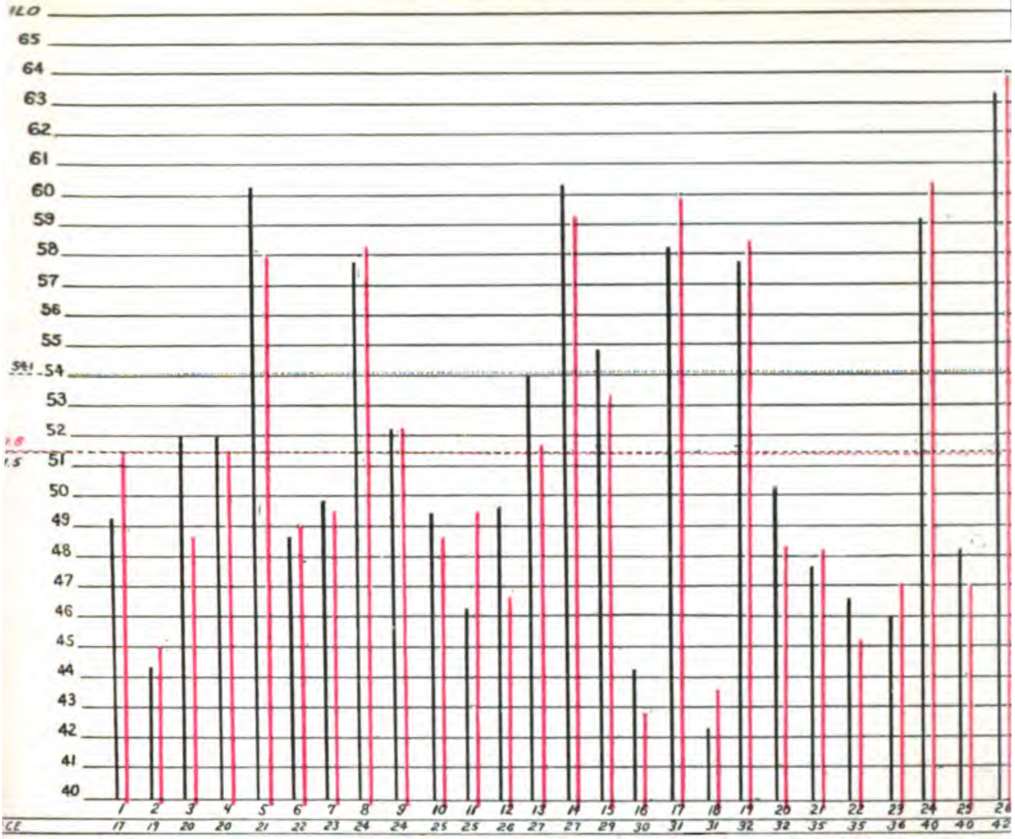
Table I. contains a summary of some of the changes that have been observed. It will be easily understood without further explanation.

TABLE I.

Summary of the Changes of Measures during a Seven Months' Course in Swedish Pedagogical Gymnastics, observed on 28 Students of the Boston Normal School of Gymnastics.

	Average, 1st observation.	Average, 2d observation.	Average change.	Number of subjects whose measures have increased.	Amount of increase.	Average increase.	Number of subjects whose measures have decreased.	Amount of decrease.	Average decrease.	Number of subjects whose measures have not changed.
	mm.	mm.	mm.		mm.	mm.		mm.	mm.	
Height, standing . . .	1575	1578	+3	15	1-30	+6	0	—	—	11
Height, pubis	753	755	+2	9	1-9	+5	1	1	—	16
Height, navel	936	938	+2	14	1-9	+4	0	—	—	12
Height, sternum . . .	1283	1286	+3	15	1-15	+5	2	1-2	—	9
Head girth	544	546	+2	11	3-9	+5	0	—	—	15
Head breadth	146	148	+2	20	1-5	+2	0	—	—	6
Neck girth	301	299	—2	5	1-10	+3	15	1-10	—4	6
Neck breadth	98	99	+1	13	1-3	+2	6	1-4	—2	7
Chest girth, repose . .	701	739	+38	26	10-90	+38	0	—	—	0
Chest girth, full . . .	774	806	+32	26	7-80	+32	0	—	—	0
Chest girth, 9th rib, repose	624	638	+14	23	5-40	+18	1	5	—	2
Chest girth, 9th rib, full	703	716	+13	24	3-30	+14	1	3	—	1
Chest depth	171	177	+6	24	1-16	+6	1	2	—	1
Breadth, nipples . . .	199	207	+8	22	1-20	+6	0	—	—	4
Breadth, shoulders . .	352	364	+12	23	2-32	+14	0	—	—	3
Stretch of arms	1591	1594	+3	12	4-10	+6	0	—	—	14
Waist girth	606	619	+13	21	10-40	+16	2	3-20	—11	3
Waist breadth	215	218	+3	15	1-13	+7	4	4-6	—5	7
Abdomen depth	169	161	—8	1	4	—	23	2-26	—9	3
Hips, breadth	319	330	+11	25	1-28	+12	0	—	—	1
Hips, girth	882	902	+20	24	10-35	+21	0	—	—	2
Thigh, right, girth . . .	525	515	—10	7	5-20	+9	17	5-40	—19	2
Thigh, left, girth . . .	523	513	—10	6	2-20	+9	18	5-35	—17	2
Knee, right, girth . . .	349	339	—10	2	3-5	+4	23	3-30	—13	1
Knee, left, girth . . .	347	338	—9	3	3-10	+6	21	5-30	—13	2
Calf, right, girth . . .	335	329	—6	3	5-6	+6	22	2-20	—7	1
Calf, left, girth	333	330	—3	7	1-8	+4	17	1-20	—6	2
Upper arm, right, girth .	260	262	+2	14	2-10	+5	6	1-8	—5	6
Upper arm, left, girth .	256	259	+3	17	1-13	+6	4	4-8	—5	5
Forearm, right, girth . .	206	207	+1	13	5-16	+7	12	1-12	—6	1
Forearm, left, girth . .	205	206	+1	13	1-15	+6	10	1-12	—7	3
	Kilo.	Kilo.	Kilo.		Kilo.	Kilo.		Kilo.	Kilo.	
Strength, back	64.8	85	+20.2	25	2-40	+21	1	1	—	0
Strength, legs	112.5	138.8	+26.3	23	1-74	+29.8	0	—	—	3
Strength, chest	27.3	31	+3.7	22	0.5-8	+4.4	0	—	—	4
Strength, forearm, right	25.9	27.5	+1.6	15	1-13	+4.5	6	1-6	—4.1	5
Strength, forearm, left .	23.6	24.8	+1.2	14	1-7	+4	7	1-7	—3.4	5
Total strength	254	306.9	+52.9	25	7-120	+55	1	1	—	0
Weight	51.5	51.6	+0.1	14	0.1-3.5	+1.2	12	0.1-3.2	—1.4	0
	Liter.	Liter.	Liter.		Liter.	Liter.				
Lung capacity	2.54	2.67	+0.13	20	0.03-0.52	+0.16	0	—	—	6

TABLE 2. WEIGHT (W.)

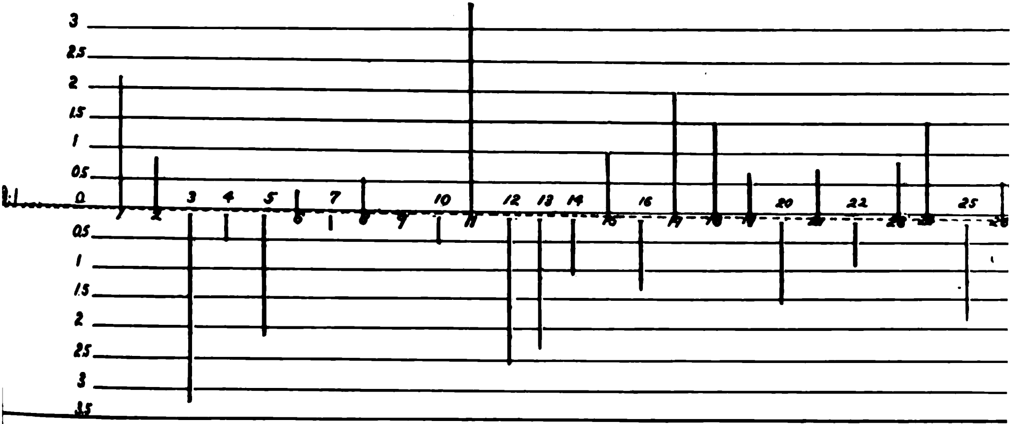


A WEIGHT INDICES ▌FIRST OBSERVATION ▌SECOND OBSERVATION

- - - - - - - - - - AVERAGE WEIGHT FIRST OBS.

- - - - - - - - - - " " SECOND OBS.

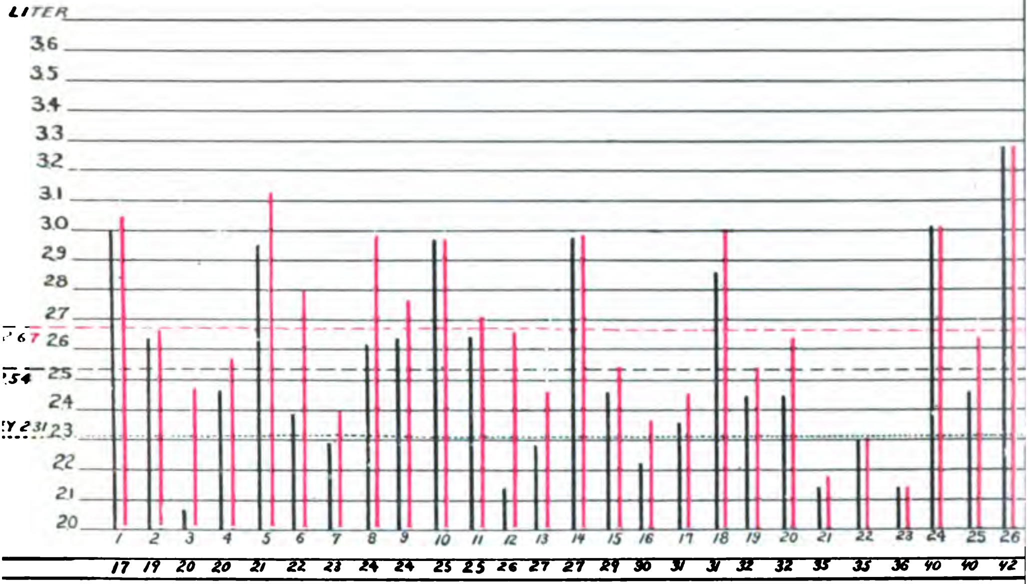
.... " " WELLESLEY STUDENTS



B. CHANGE OF W. OBSERVED AFTER 7 MONTHS OF SWEDISH PEDAGOGICAL..GYMNASTICS.

- - - - - - - - - - AVERAGE CHANGE.

TABLE 3. LUNG CAPACITY (L.C.)

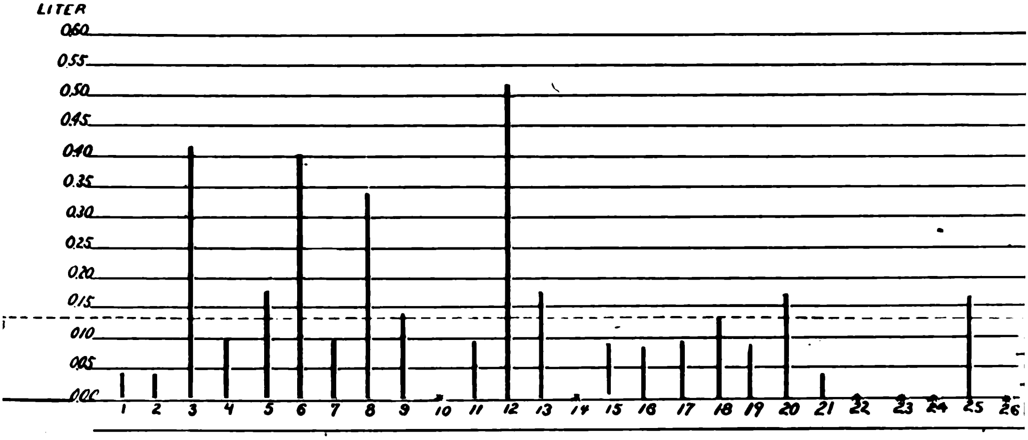


A. LUNG CAPACITY INDICES | FIRST OBSERVATION | SECOND OBSERVATION

———————— AVERAGE L.C. FIRST OBS.

– – – – – – – – " " SECOND OBS.

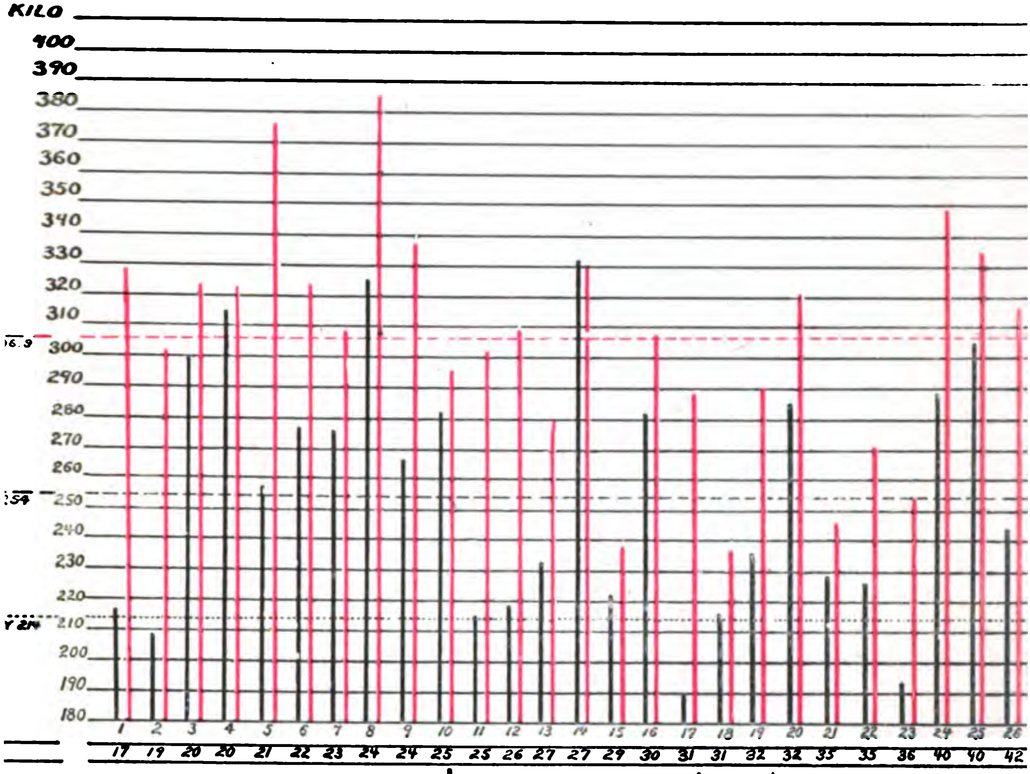
.... " " WELLESLEY STUDENTS



B. CHANGE OF L.C. OBSERVED AFTER
7 MONTHS OF SWEDISH PEDAGOGICAL GYMNASTICS.

– – – – – – – – – – AVERAGE CHANGE.

TABLE 4. TOTAL STRENGTH (T.S.)

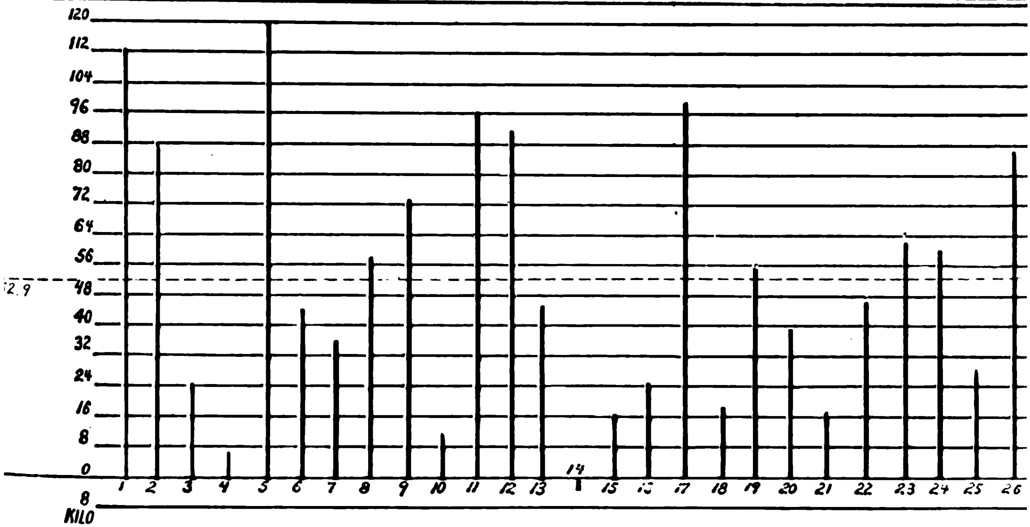


A. TOTAL STRENGTH INDICES | FIRST OBSERVATION. | SECOND OBSERVATION.

________ AVERAGE T.S. 1ST OBSERVATION

- - - - - - - " " 2ND. "

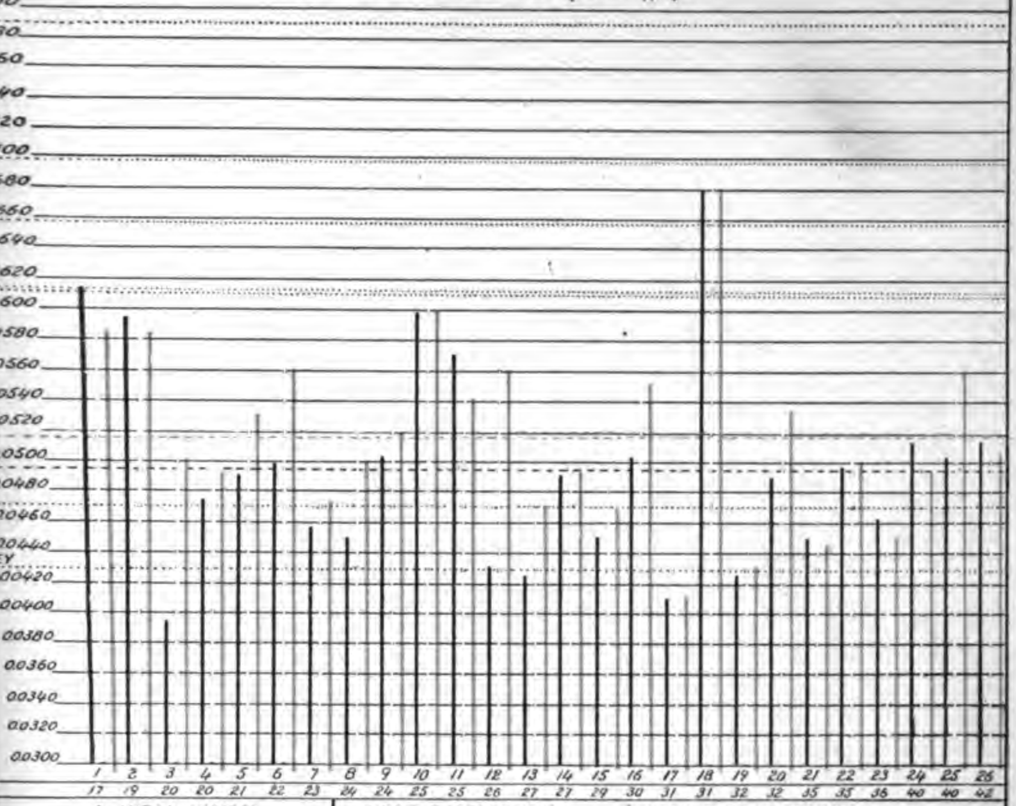
.... " " WELLESLEY STUDENTS.



B CHANGE OF T.S OBSERVED AFTER 7 MONTHS OF SWEDISH PEDAGOGICAL GYMNASTICS.

- - - - - - - - - AVERAGE CHANGE

TABLE 5. VITAL INDEX. $\left(Vi = \frac{LC}{W}\right)$.



A. VITAL INDICES. | FIRST OBSERVATION. | SECOND OBSERVATION.

-------- AVERAGE Vi FIRST OBS.

" " SECOND "

" " WELLESLEY STUDENTS.

.... I Vi OF A FRENCH GYMNAST.

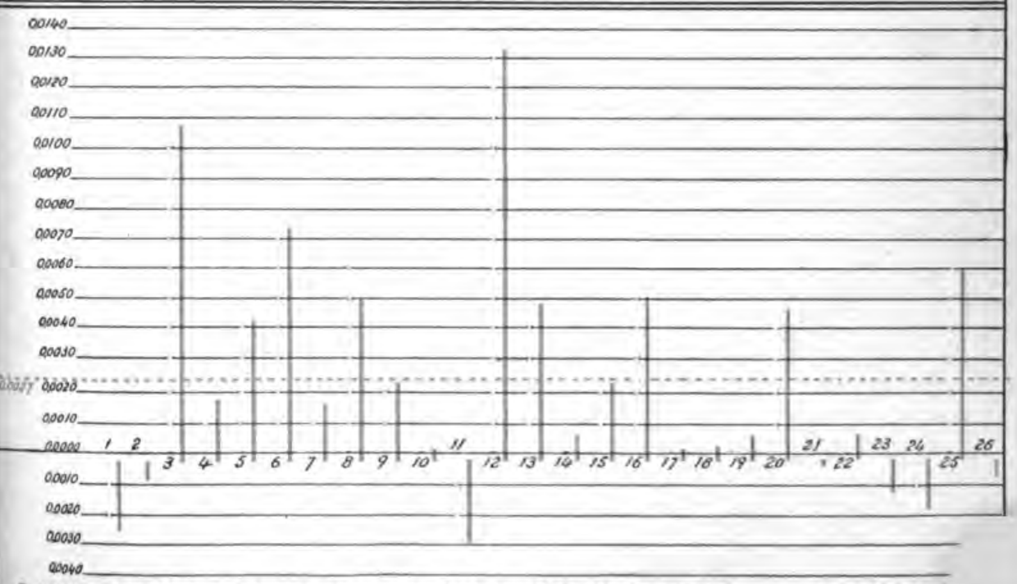
.... II AVERAGE Vi OF 113 SWEDISH NAVY RECRUITS (AGE 19).

.... III Vi OF THE YALE STUDENTS OF 50% MEASURES.

.... IV AVERAGE Vi OF THE AMHERST STUDENTS.

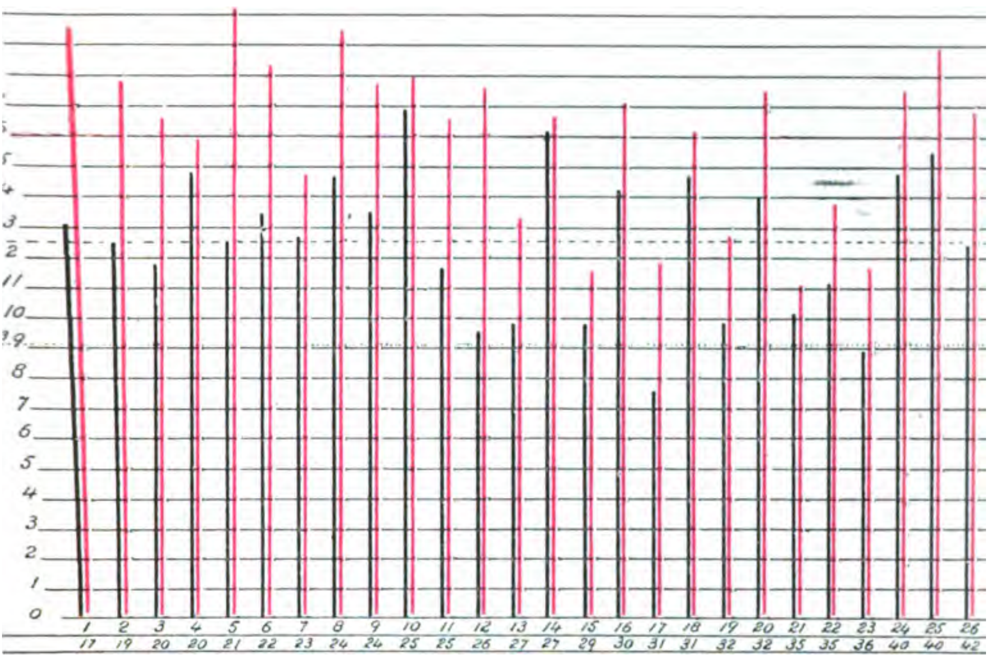
.... V " " " TRAINED FRENCHMEN (AGE 22).

.... VI " " " UNTRAINED HEALTHY FRENCHMEN.

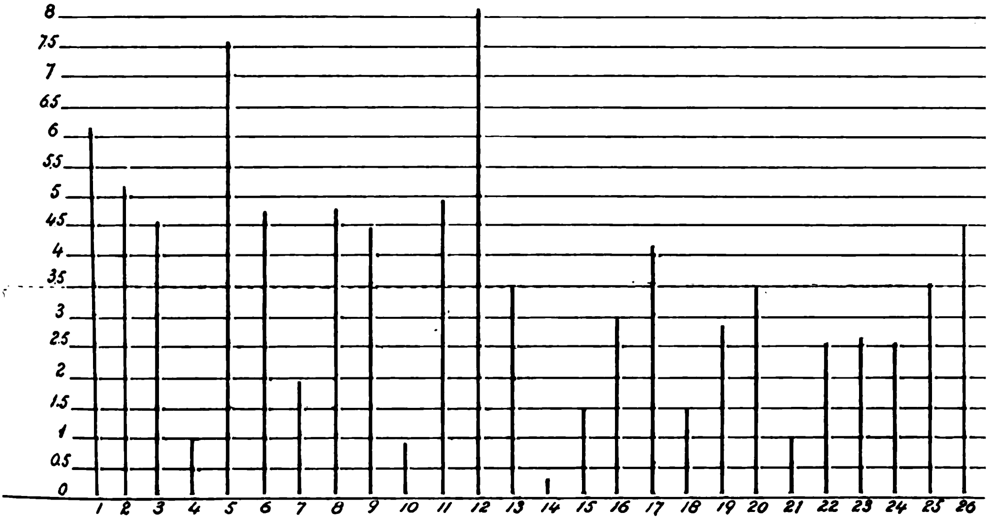


B. CHANGE OF Vi, OBSERVED AFTER 7 MOS. OF SWEDISH PEDAGOGICAL GYMNASTICS. ------ AVERAGE CHANG

TABLE 6. POWER INDEX($Po = TS\frac{Lc}{W}$).



A. POWER INDICES. | FIRST OBSERVATION. | SECOND OBSERVATION.
------------ AVERAGE Po FIRST OBS.
----------- " " SECOND "
.... " " WELLESLEY STUDENTS.



B. CHANGE OF Po, OBSERVED AFTER 7 MONTHS OF SWEDISH PEDAGOGICAL GYMNASTICS.
.... AVERAGE CHANGE.

Weight.—Examining Table II., we find that 14 subjects have increased their weight by from 0.1 to 3.5 kilo., 12 have diminished by from 0.1 to 3.2 kilo. Gain and loss balance each other, so as to give back the same, or nearly the same, average value. The changes in these cases seem to have some relation to age. Those under 20 years have increased in weight; those between 20 and 30 have lost; those over 30 have gained. The exceptions from this generalization of the cases, the ones between 20 and 30 that have gained weight, are all cases of those that have been less energetic workers, from one reason or another; and, on the other hand, those over 30 that have lost weight are very energetic workers, although it must be said that also most of the 7 subjects over 30 who have gained in weight have been energetic workers during the course. We find consequently that all have changed their weight during the training.

What has been the standard of this change? It has not been another average, because, while all have changed individually, all changes together have left the average of this item practically unchanged. Allow me here to make an anticipation of what will be the result of my discussion.

Every individual has increased her physical efficiency, measured by strength, endurance, and skill. For instance, by all the changes of the individual efficiencies the average strength of the class has been raised by about 20 per cent. of its starting value. Now, having added that much to starting efficiency without having added anything, practically,* to the average of weight, indicates that in these cases there does not exist necessarily any causal relation between efficiency of all and quantity of mass of all: it is weight, expressed in average of all. Moreover, it indicates conclusively that there does not exist necessarily any relation between growth of individual efficiency on one side and increase of individual total mass on the other. But I do not say that there does not exist an intimate relation between growth of efficiency and change in mass. But the change of mass coincident with growth of efficiency may sometimes be increase of weight, sometimes loss of weight. It is evidently connected with gain of some constituents of the mass and loss of others, and with changes in the relation of the mass as a whole to other items.

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* More exact, having added 0.2 per cent.

Lung Capacity.—Table III. indicates growth of this item is evidently the change coincident with the development of efficiency. Twenty subjects have increased this measure by from 0.03 to 0.52 liter : six have undergone no change. Some relation to age is suggested by the observation of these cases. The greatest increase has taken place before the age of 27. After the age of 27 increase, in lesser degree, prevails up to the age of 35. Between 35 and 42 further increase has taken place in 1 case out of 5, this being the case of an energetic worker ; but also among those that have had no increase there are some very energetic workers. Examining the cases where no increase has taken place, we find that the subjects Nos. 10 and 14 already at the start possessed high lung capacity, or 2.95 liters each, which is 0.28 liter above the final average of the class and 0.64 liter above the Wellesley average. Cases Nos. 24 and 26 are already at the start of unusually high lung capacity, or over 3 liters. Of the remaining 2 cases, one, No. 22, is at the value of the Wellesley average, and is a subject of very light weight (45.6 kilo.), while No. 23 remains the lowest lung capacity of all these cases. For some reasons this subject has been an unenergetic worker during the course. Consequently, the 6 cases in which no increase of lung capacity has taken place can be classed as exceptional. But also in these cases further development of physical efficiency has taken place, as I shall show presently. What has been the standard of the development of this item? Evidently, not the average of the same item of the 1,100 Wellesley students. Because already at the start only 8 were below the Wellesley average, and at the second measurement the index of but 1 subject approaches the Wellesley average. All the others have passed beyond it, and continue to recede from it toward their own heights, moving their own average line steadily higher. Somewhere the growth will stop, to be sure ; but where this will take place no one can decide by consulting the average of 1,100 nor even of 11,000,000 of other subjects, unclassified or classified accidentally or arbitrarily. The standard for this development we must seek somewhere else. Before going further in the examination of this question, permit me for a moment to call your attention to the strength measures.

Total Strength.—With one exception all have increased this item, 6 of them by about or nearly 50 per cent. above their starting condition. No particular relation to age can be traced in the diagrams on Table IV. The exceptional one who has not gained in total strength during the training is the case of a considerably strong subject, whose strength at the first measurement was beyond what the second measurements give as the average strength of the class. The development is even, leaving only 3 under the starting average-line, and bringing 17 up to or over the final average-line. In this item, then, as every one would anticipate, increase is the rule. Even here the goal is no average established by other unclassified subjects. No millions of Wellesley students, for instance, would suffice to establish a leading average for our twenty-six. They are moving their strength indices away from limits hitherto recorded in the literature on this subject. Even here we may conclude that the standard for development, if found anywhere, must be sought somewhere else than in the average of any number of other subjects accidentally classified. Now let us make a comparison of these three diagrams with a view to seek some information from the relation of the three items.

Ratio of Lung Capacity and Weight.—By measurements of children of the Collège de Sainte-Barbe des Champs, Demény (*l. c.*) has found that in children of the same age the lung capacity is proportional to their weight, and that, if we construct the curve of lung capacity and weight in function of age, the two curves are parallel. Moreover, he has found that the ratio of lung capacity and weight of persons who have submitted themselves to systematic physical training is much higher than the same ratio in persons who have not had such training, from the fact "that the training, on the one hand, increases the lung capacity, and, on the other, in the beginning diminishes the weight by causing a great part of the reserve tissues to disappear." In Table V. I have indicated a few figures from Demény's observations. He has found the average ratio of methodically trained Frenchmen (age 22) to be 0.0615 ; the highest ratio recorded by him is 0.0790; the average ratio of untrained but healthy men is given as 0.0470; the lowest of untrained healthy men recorded by him is 0.0385.

I have examined this ratio in the 26 cases which are the subject of this paper, and the result is given on the diagrams of Table V., which I have called the vital index diagram. We find that at the start the average vital index of our class was above the Wellesley average-line, and above Demény's line for healthy untrained Frenchmen. Under the training all have so developed themselves that they have given a considerable lift to the average Vi of the class. All have participated in the growth of Vi, with the exception of 7, as shown by diagram *b*. The exceptions are cases in which the growth of weight has somewhat outrivaled the lung capacity. Moreover, we find that several of these women have lifted their vital index up to the vicinity of the Amherst line, which is nearly identical with Demény's average-line for healthy, methodically trained, 22-year-old Frenchmen. One of our students is above the Yale line, and is surpassed only by the Swedish navy recruits and the highest ratio recorded by Demény. This is a particularly interesting point, that here we have to do with the index of a purely human character, by which men and women can be measured with about equal chances.

If we were compelled to translate this index into popular language, we could not come nearer the truth than to say that it means power of resistance during the emergencies of disease, and that it expresses an essential and fundamental condition for endurance under effort. It does not represent the moral or the nerve-dynamic elements of endurance, but it represents a chemic-dynamic component of endurance. This, then, is about the force of this index, but also its limitation. Demény (*l. c.*) makes this statement: "By taking young gymnasts and arranging them according to the decreasing value of their ratio of lung capacity and weight, we have been able to ascertain that thereby we have made a classification that corresponds sensibly to their degree of resistance." I have examined the relation between this index and the aptitude of the individual to work, particularly in gymnastic work. Having given daily lectures and recitations on applied science to the class, also having personally conducted the gymnastic exercises every day, I have had unusually favorable opportunities to make observations in this direction. This study has given me great interest; and as the results obtained have been strengthened by the study of a larger material, coming under my observation since this paper was nearly completed, I will present some of these results. I found a marked correspondence between the vital index and ability in such exercises in which the weight of the body is carried by the arms or thrown from the ground by forcible contractions of the muscles of the legs, as jumping and vaulting. Here I will speak about climbing the perpendicular ropes as the type of a number of variations of similar exercises. Among the 26 cases particularly referred to in this paper, no one of the 6 whose vital index was lower than 0.0478 has been found to be able to climb the perpendicular rope; while, of the 20 subjects whose vital index was 0.0478 or more, but one subject, the case No. 26, was unable to climb the rope. When I arranged the subjects after the decreasing vital index, it occurred to me that I had made a classification that showed a fairly good correspondence with the degree of ease with which the rope-climbing exercise appeared to be done. The classification, though, was not entirely satisfactory, but suggested the need of a modifying readjustment. However, with certainty, I could see that those whose vital index was above 0.0550 formed a higher class of climbers than those whose vital index fell between 0.0478 and 0.0550. Therefore, it was desirable to attempt to trace the cause of the apparent exceptions and irregularities under this classification. The probability pointed to one of the two following causes: different degree of muscular strength or difference of central-nerve adjustment to the exercise, *i. e.*, difference in the skill. Considering the skill-element, however, it must be observed that, while training under the Ling System, the progression of exercises is so gradual that, when the climbing is attempted, it has been introduced by a number of preparatory exercises, so the skill-test of the climbing may be compared to the spelling of syllables that beforehand have been mastered separately. Therefore, I felt induced to inquire as to the condition of strength of the subjects. For this purpose I examined, **first**, the ratio of the total strength and weight of each individual ($\frac{TS}{W}$), and then the product received by multiplying this ratio and the vital index (Vi $\frac{TS}{W}$). As I shall have to mention both these indices several times, I beg your permission, for the sake of convenience, to call the former the *strength-weight index* ($\frac{TS}{W}$) and the latter the *vital strength-weight index* (Vi $\frac{TS}{W}$). On the following table is found the value of these indices of the 26 cases :—

TABLE VII.

FIRST OBSERVATION.			SECOND OBSERVATION.		
Number.	**Strength-weight Index.**	**Vital Strength-weight Index.**	**Number.**	**Strength-weight Index.**	**Vital Strength-weight Index.**
1	4.4	0.2680	1	6.4	0.3763
2	4.7	0.2782	2	6.7	0.3932
3	5.8	0.2279	3	6.6	0.3319
4	6.0	0.2838	4	6.2	0.3056
5	4.2	0.2054	5	7.2	0.3844
6	5.7	0.2782	6	6.5	0.3666
7	5.5	0.2524	7	6.2	0.2963
8	5.6	0.2537	8	6.6	0.3333
9	5.1	0.2560	9	6.4	0.3366
10	5.7	0.3409	10	6.0	0.3612
11	4.4	0.2504	11	6.1	0.3318
12	4.8	0.2069	12	6.6	0.3722
13	4.3	0.1823	13	5.4	0.2559
14	5.5	0.2689	14	5.6	0.2777
15	4.0	0.1796	15	4.4	0.2076
16	6.4	0.3266	16	7.1	0.3926
17	3.2	0.1299	17	4.8	0.1963
18	5.1	0.3468	18	5.4	0.3699
19	4.4	0.1866	19	5.0	0.2160
20	5.7	0.2793	20	6.6	0.3550
21	4.8	0.2150	21	5.1	0.2279
22	4.8	0.2371	22	6.0	0.3012
23	4.2	0.1940	23	5.4	0.2440
24	4.7	0.2402	24	5.7	0.2838
25	6.3	0.3156	25	7.2	0.4053
26	3.8	0.1961	26	5.0	0.2555
Average	5.0	0.2461	**Average**	6.0	0.3145

It is reasonable to suppose that the aptitude for exercises demanding the weight of the body to be lifted by the individual's own muscles will be found to be largely dependent upon the ratio of total strength and weight. By examining this ratio, I have found that every one of the 26 subjects whose strength-weight index is 5.6, or more, is able to climb the perpendicular rope ; while of those whose strength-weight index is 5.4, or less, only one is a climber. This exceptional one is the case No. 18, with strength-weight index 5.4, but whose vital index is 0.0685, or the highest vital index in the whole class. The two other cases of strength-weight index 5.4, or Nos. 13 and 23, are unable to climb; and we find their vital indices to be 0.0474 and 0.0452. On the other hand, we find that the case No. 26, with Vi 0.0511, who, as stated above, is the only exception to the rule in these cases,—that those of Vi above 0.0478 can climb,—possesses a strength-weight index of only 5.0.

I have arranged the 26 cases according to decreasing strength-weight indices, and found that thereby is obtained a classification that corresponds tolerably well with the relative capacities of the subjects in gymnastic exercises of the climbing type. This classification, however, as well as the classification after decreasing vital indices, suggests the need of some modifying rearrangement, in order to become correct. From my observations, though, it becomes evident that those whose strength-weight indices fall between 6.2 and 7.2 form a higher class of climbers than those whose indices fall between 5.4 and 6.2. The observation alluded to above, that the vital indices and the strength-weight indices seemed mutually to modify each other's influence upon certain exercises, caused me to examine the product received by multiplying the two indices, or the vital strength-weight index. This index I have found to offer a classification which has but few exceptions. Those of our 26 whose vital strength-weight index is 0.2777, or more, are all climbers: those of 0.02559, or less, are unable to climb. This rule holds without a single exception. Arranging the subjects according to the decreasing value of this index, we obtain a classification that corresponds to the relative capacities of the subjects in climbing and similar exercises. Those possessing a vital strength-weight index between 0.3000 and 0.4000 form a class of higher capacity and more manifold adaptability toward gymnastic exercises than those whose corresponding index falls below 0.3000. In this highest class those whose vital strength-weight index is composed of a vital index between 0.0550 and 0.0600, and a strength-weight index of 6.2, or more, seem to be more favorably posted than one whose vital strength-weight index is of equal height, but composed of one extremely high index, the other low (as, for instance, the case No. 18). Besides this, the only additional readjustment that the classification calls for seems to exclusively depend upon differences in the moral attitude towards the work (different degree of interest and determination) or differences that refer to the higher central-nerve training (different degrees of power of attention and comprehension, self-collection and concentration, co-ordination, self-control, resistance against disturbing influences from without, and so forth).

I have observed the vital strength-weight indices of 51 other students (women) who were trained together in one class, and for the sake of comparison I have indicated their relative rank as climbers by the following marks : A^1, A^2, Ab^1, Ab^2, B^1, B^2, C. A^1 means excellence, C entire inability, B^2 the first struggling success to climb a few inches upward, the other marks indicate the intermediary stages of proficiency. At the observation made before the training began the average index of the 51 subjects was 0.2198 : seven months later it was found to be 0.2850. Comparing the marks and the indices at the end of the course, I found that 5 subjects were still below 0.2000. Of these 4 were C-climbers : one, of index 0.1939, was a B^2-climber (an intensely energetic worker). Twenty-eight subjects had their indices distributed between 0.2000 and 0.3000 : their climbing is advancing from B^2 towards A^2 in fair correspondence with the growth of their indices, with the exception that 6, who are intensely energetic workers, have lifted their climbing mark considerably in advance of their vital strength-weight index, and that 1, with index 0.2676, is a C-climber, due to less energetic work. The remaining 18 subjects were found to have surpassed 0.3000, and had their indices distributed between 0.3021 and 0.5270. Of these 17 were A^1-climbers, 1 was an Ab^2-climber : this latter one possessed the index 0.3481, but composed of strength-weight index 5.26 and vital index 0.0662,—an extraordinarily high vital index for a woman, so far as can be inferred from about 100 cases of women whom I have observed in this respect. As time and space do not admit of any further quotations from these observations, I present the following summary of the relation of climbing marks and vital strength-weight indices. The figures indicate the number of students who have the index as given at the top of the perpendicular column and the mark in climbing as given at the head of the horizontal column.

TABLE VIII.

Comparison of Vital Strength-weight Indices and Marks in Climbing of 51 Junior Students of the Boston Normal School of Gymnastics.

	0.1659-0.1999	0.2000-0.2499	0.2500-0.2599	0.2600-0.2699	0.2700-0.2799	0.2800-0.2899	0.2900-0.2999	0.3000-0.3499	0.3500-0.3999	0.4000-0.4499	0.4500-0.5000	0 5000-0.5270	Total.
A^1	—	—	—	•3	—	—	—	10	3	3	—	1	20
A^2	—	•2	—	•1	1	1	2	—	—	—	—	—	7
Ab^1	—	1	2	1	2	—	—	—	—	—	—	—	6
Ab^2	—	3	2	—	1	—	—	1	—	—	—	—	7
B^1	—	2	—	—	—	—	—	—	—	—	—	—	2
B^2	•1	2	1	—	—	—	—	—	—	—	—	—	4
C	4	—	—	1	—	—	—	—	—	—	—	—	5
Total	5	10	5	6	4	1	2	11	3	3	—	1	51

• Intensely energetic workers.

The result of the discussion above may be summed up briefly.

1. The *vital strength-weight index* grows parallel with the growth of efficiency and adaptability to gymnastic exercises; and is indicative of the degree of an individual's training with reference to gymnastic exercises. This index becomes still more instructive in this respect, if its component vital index and strength-weight index are consulted also.

2. Under ordinary circumstances those (women) of vital strength-weight index lower than 0.2000 are not in condition for gymnastic exercises so vigorous as climbing; those of 0.3000 or more are in excellent condition for such exercises; those between 0.2000 and 0.3000 are between unable and well-conditioned.

3. Under ordinary circumstances the *vital index* necessary for ability to climb is in the neighborhood of 0.0474, but in combination with a high strength-weight index or a very energetic moral disposition some imperfect climbing may exist with even lower vital index, and has been observed in a case with as low a vital index as 0.0444.

4. Under ordinary circumstances the *strength-weight* index necessary for ability to climb is about 5.4; but, in combination with high vital index or a very energetic disposition, climbing may be possible with lower strength-weight index, and some imperfect climbing has been observed in a case with strength-weight index only 3.6.

5. Two vital strength-weight indices of equal number may have different values, as exponents of physical efficiency, depending upon whether they are composed of a vital index and a strength-weight index of corresponding heights or of a high and a low index.

6. So far as can be judged from observation of about 100 cases, the vital strength-weight indices of women which correspond to the highest efficiency of the most manifold adaptability in the gymnasium are those composed of a strength-weight index of 6.2 or more, and a vital index of 0.0550 to 0.0600 or somewhat above 0.0600. Those composed of a low strength-weight index and a vital index considerably higher than 0.0600 (0.0650 or more) are more difficult to estimate, and their number is comparatively small.

These indices, then, express very distinctly the aptitude of the individual for a number of gymnastic exercises, particularly such as (in the Swedish gymnasia) are called heave-movements, vaulting, and jumping (exercises on perpendicular and slanting ropes and poles, ribstool, rope-ladders, horizontal, perpendicular, and oblique wooden ladder, double boom and single boom, horse, buck, vaulting box, jumping over rope, and pole-vaulting, etc.). These indices do not express with equal certainty the capacity of producing outer work or of such gymnastic and athletic exercises in which an outer body is moved or an outer resistance combated (as putting the shot, wrestling, or, generally, the strength exercises). The rank in such exercises, evidently, cannot be measured sufficiently by an index the growth of which may depend largely upon diminished weight. Some index in which the total strength directly enters as a factor may be tested with probability to be found useful. When I arranged the subjects according to their decreasing total strength, the classification obtained seemed to me to be very irregular and unsatisfactory when compared with the efficiency of the subjects, as suggested by the appearance during the exercises. I have therefore constructed an index by multiplying the vital index and total strength of each individual. The product gives a figure which in the one hundred cases hitherto examined falls between 7.89 and 25.05. By arranging the subjects by the decreasing value of this index, I have obtained a classification that corresponds satisfactorily with my subjective estimate of the efficiency of the students. As strength exercises of the kind here referred to have but a limited use in the training of women, according to my views, I have not had the opportunity to give this index as much test as the vital strength-weight index. However, the observations made justify me in encouraging others, who may have favorable opportunities to make observations in this direction, to examine this index. It offers a particular interest because of the fact that, if translated into popular language, this index is the product of strength and endurance (within the limitations stated above); and the product of strength and endurance means, if skill be not considered, the same as working capacity. For this reason I present these products of the 26 cases at the beginning and at the end of the seven months' course in Swedish pedagogical gymnastics. They are given on Table VI., which I have called the *power-index* diagram. An examination of this diagram shows that, notwithstanding the differences of the isolated measures of weight, lung capacity, and muscular strength, on the plane which this diagram represents they all compare favorably with each other. This index, as well as the vital strength-weight index, expresses something more total and unified concerning an individual than any of the isolated items. On this plane all have developed their individual indices, although the constituents that have built up these indices vary; and, consequently, all these indices, even those of them that are equal, are not similar, but contain their characteristic individualities. This diagram proves the development to have been satisfactorily uniform. All have passed beyond the similarly computed Wellesley average index. Only 4 have not reached beyond the starting average of the class, while 18 are near or beyond the final average. It is of great interest, with this power-index diagram as a basis, to trace the individual differences, and to see how the road of improvement runs differently for individuals of constitutional differences, even while trained under the same method by the same or equivalent exercises. Space does not admit the presentation of this aspect of the subject in the present paper.

Permit me to suggest some practical applications and uses of the indices I have presented. Write in a column a series of figures such as those I have given above as representing the vital strength-weight indices, beginning, for instance, by 0.1000, thereafter 0.1100, and so on, adding 100 for each following index up to 0.6000. Write in another parallel column your experiences regarding the indices. This column of figures you may use as a rod by which to measure the condition of an individual with reference to his aptitude for various gymnastic exercises, if only the weight, lung capacity, and total strength measures are known. If you are to use it in a gymnasium for women, you may take advantage of the observations I have presented above ; *i.e.*, you may call the 0.1000 to 0.2000 indices unfit for such vigorous exercises as referred to above, the 0.3000 and higher indices may be called excellent conditions, and the 0.2000 to 0.3000 indices are the intermediary conditions. Under each of these three groups subdivisions may be made. If you wish to apply it to the measures of men, of boys, or of girls under 20, you must first investigate into the correlation of the successive indices and the physical condition for exercise. I have had no opportunity to extend my observation to those last-mentioned classes of individuals. A practical advantage of such a test is that anybody in the position of a school principal, a superintendent, or director of physical education, who is responsible for a large number of students, the immediate instruction being given by subordinate teachers, may be able thereby to easily single out those who are unfit for vigorous gymnastic exercises, those who may indulge in them safely, and those of intermediary condition, who should be under particularly careful attention on the part of the teacher, because they work under the excitement of beginning success, yet with deficient powers.* I refer particularly to those of vital strength-weight index between 0.2000 and 0.2600 or 0.2700. I think by some such singling method persons in such positions as I have referred to may be facilitated in the exercise of their responsibilities.

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* It must be remembered that only healthy people are considered in the discussion in this paper.

From the teacher who gives the immediate gymnastic instruction we must demand that he must be so much in possession of his art as to be able to estimate the condition of his pupils even without consulting such measurements: his eye must be trained to see quickly even finer points than can be recorded by the measuring instruments. But even for him the index here discussed may be of interest. In my practical work I always apply Ling's test for proper degree of effort in any exercise; namely, that it must be done with "full, free breathing, and with precision." I have had opportunity to observe cases where attempt to climb the rope produced short breathing and an expression of distress; and I have found those to be cases where the vital index was between 0.0450 and 0.0470, and the vital strength-weight index between 0.2000 and 0.3000. The first part of Ling's test seems to refer to the same critical condition as is expressed by a certain range of values of the indices I have discussed. The latter part of the test, precision, is of a nerve-dynamic character. In my work I give the students a balance-exercise, that reasonably corresponds to the ability of the class, immediately after the vigorous heave-movements and jumps. If all can take this balance-exercise with reasonable precision, I feel satisfied that I have not overtaxed the nerves of the students by the previous exercise. This practical test may continue its usefulness until we shall find a nerve-dynamic index of more scientific exactness.

Returning again to the vital strength-weight index and the power-index, it may be said that, inasmuch as these indices are parallel with the growth of efficiency and adaptability to more vigorous and difficult tasks, the growth of these indices in each individual during a course of training may be of assistance in estimating the value of the method of training pursued and in estimating the comparative values of different methods. Hereby it must be remembered that these indices express only the condition of the nutritive functions, particularly the respiration, and the contractile power of the muscles, and the nerve-dynamic element embraced by the strength-test. They consequently need to be supplemented by several other tests that indicate the value in other aspects of the changes brought about by the training, such as the moral and skill aspects of the training, the nerve-dynamic endurance, the orthopedic and æsthetic value of the changes. Some of these aspects may be considered accessible to inquiry by exact methods. Having opportunity to make observations in some of these directions, it is my hope, on some future occasion, to be able to give some contribution to the further discussion of this subject.

In conclusion, I venture to say that, in order to make the application of anthropometry *directly useful in physical education*, we must not rest satisfied with building up averages of 50 isolated items of a million of subjects, but also must study the 50 subjects as living units and totalities in a million of aspects; or, plainly speaking, we must not lose ourselves so much in the one-sided pursuance of a statistic method that we neglect the casuistic study. Furthermore, I will say that, in view of the indices that have been discussed in this paper, the development of the 26 cases has been creditable to the method of training pursued. The power-index diagram shows that in seven months these women have increased their physical efficiency, so far as expressed in this diagram, by 32 per cent. above their starting standard: 26 persons have grown to the efficiency of 34. And, still, they have not given up their lives to taking exercise. They have, during the same period, every day done a creditable amount of intellectual work. Moreover, let us consider that all these indices are not finished lines: they are growing lines, their pointed ends upward.

Such results give encouragement to serve the cause which this Association has inscribed as its own,—the advancement of physical education.

CLAES J. ENEBUSKE.

BOSTON, April, 1892.

BUSINESS SESSION.

The meeting was called to order at 9.40 A. M., President Hartwell in the chair. The first part of the session was devoted to the annual business meeting.

On motion the reading of the minutes of the last annual meeting was dispensed with.

It was moved that the Association should adjourn at half past twelve o'clock. Lost.

The secretary reported that he had a list of two hundred names of new members who had been approved by the council. On motion it was voted that to save time the reading of the names should be dispensed with as the council had acted favorably on all the names that were in the secretary's hands.

Blank ballots for the election of officers were distributed to the members.

DR. SARGENT : Before we proceed to the election of officers there is a matter that I think ought to be brought to the attention of the Association and I should like to bring it in as an amendment to the amendment which Dr. Seaver presented last year to be acted on this year. It is as follows :—

The officers of this Association shall consist of a president, six vice-presidents, who, with the ex-presidents, who for a term of five years from the time of holding office as president, shall constitute a council ; a secretary, and a treasurer to be nominated by the president and approved by the council.

The reason for making this amendment is that our organization has grown very extensively within the last few years and we are impressed with the necessity of having a closer relation between the president and the treasurer and secretary, if not the executive committee. In order to carry out such a programme as this a great deal of work is necessary and the duties of the treasurer and secretary will be constantly on the increase. There is an immense deal to be done if we are to maintain the dignity of a national Association. The correspondence amounts to a great deal.

I look forward to the time when we can have a permanent secretary. We ought to have one who shall know every person who is a member. I hope also the time may come when we shall remunerate him, at least hire clerical aid in carrying on the work of the Association. Perhaps when that time comes the secretary and treasurer can be one person. In order to have this amendment take effect next year it must be presented this year.

Mr. Cobb moved that a committee of five should be appointed to bring in a list of nominations for officers.

Dr. Gulick said that that plan had been tried and abandoned. Nominations must be made from the floor. That was the method last year and the result was satisfactory.

Dr. Sargent said that he heartily indorsed Dr. Gulick's remarks. The Association should be kept as democratic as possible.

Mr. Cobb said it was not a question of democracy but of saving time.

The motion of Mr. Cobb was put to vote and lost.

Nominations for president were then called for. Three persons were nominated, Dr. Jay Seaver, Dr. D. A. Sargent, and Dr. E. M. Hartwell.

Dr. Savage and Mr. Bolin were appointed tellers to receive and count the ballots.

The following persons were nominated for vice-presidents : Dr. E. Hitchcock, Sr., Dr. Luther Gulick, Dr. E. M. Mosher, Dr. Hall of Haverford, and Col. F. W. Parker.

For secretary, Dr. Luther Gulick and Dr. Betts were nominated.

Dr. C. E. Ehinger was nominated for treasurer.

The following persons were nominated as members of the council : Dr. J. K. Schell, Dr. Mary T. Bissell, Mr. W. A. Stecher, Miss Amy Morris Homans.

On motion of Colonel Parker, as there was but one nomination for treasurer, to expedite matters, it was voted that the secretary should cast one vote for the Association. The following board of officers was reported elected by the tellers :—

President, Dr. D. A. Sargent.

Vice-presidents, Dr. E. M. Mosher, Dr. E. Hitchcock, Sr., Col. F. W. Parker.

Secretary, Dr. Luther Gulick.

Treasurer, Dr. C. E. Ehinger.

Council, Dr. W. A. Stecher, Dr. M. T. Bissell, Miss Amy Morris Homans, with Dr. E. M. Hartwell, William Blaikie, Esq. *ex officio.*

Dr. Mosher asked that she might exchange places with Dr. Hitchcock, making him first vice-president. The question was put to the Association and it was voted that Dr. Mosher should retain the place of first vice-president.

On motion of Dr. Seaver the following amendment presented by him last year was unanimously adopted :—

President Hartwell announced that invitations had been received from the director general of the Columbian Exposition, from Mr. Bonney of the Auxiliary, and from the secretary of the Young Men's Christian Association of Chicago, and from other persons, to hold the next annual meeting of the Association in Chicago. As no motion was made with reference to this matter the president said it would be considered as referred to the council.

COL. F. W. PARKER : Every one is expected to go to Chicago next year. The Auxiliary Committee is arranging to have all conventions meet there, educational, religious, scientific. I do not bring any authority to invite this Association to come to Chicago, but I know you are expected and you will be welcome and everything will be done to give a right royal welcome. There is a plan to have the different systems of physical training not only illustrated by lectures, but to have schools of physical culture during the whole fair. I am afraid it may not be carried out, but it would do more for physical culture than anything else.

DR. W. T. HARRIS : There is to be a series of conferences in Chicago next year. The first will be in May, on art, the second in June, on religion, the third in July, on education. These conferences are to be international, the educational ones at least. I have associated with me a committee and we send invitations to distinguished persons in Europe. I hope there will be a committee appointed by this body of three, or such number as you choose, that will have this matter in hand, a kind of executive committee. There will be a great many persons there in July interested in physical education. The establishment of this Association has been one of the greatest steps ever taken to advance physical education.

PRESIDENT HARTWELL: The International Institute of Statistics will meet in Chicago next year. Prominent members of this society have within the last six months taken certain steps in reference to anthropometric work. The American Statistical Association of Boston has recently authorized the formation of an anthropometric committee, to work with other committees of their association for the success of the International Institute at Chicago, so here is our chance to broaden and to focalize, to compare our methods with those in use elsewhere and to stimulate those in Europe, who have great stores of anthropometric material, to make them known. Many leading anthropometrists have joined the American Statistical Association with this in view.

DR. HARRIS: I move that a committee of five, one of whom shall be the chairman of this Association, shall be appointed to confer with Mr. Bonney of the World's Fair Auxiliary Committee, with regard to the calling of an international conference of those interested in physical education, to meet in the month of July.

Unanimously voted.

Brooklyn, N. Y., April 7, 1892.

Wm. G. Anderson, M.D., Treasurer.

In account with the American Association for the Advancement of Physical Education.

To dues collected for the year ending April 7, 1892, including moneys received from Miss Homans, Dr. Seaver, Dr. Hitchcock, and others,		$315.00
Deficit in treasury, 1890,	$16.50	
By following bills paid:—		
Andrus & Church,	7.79	
Gustave Weinschenk,	10.75	
E. Hitchcock, Jr.,	21.00	
C. H. Thurston & Co.,	3.00	
Rent of Union Hall,	50.00	
E. B. Young, check returned,	1.00	
Isabel Barrows, stenographer,	28.00	
M. A. Requa, refunded,	2.00	
Andrus & Church, on account,	90.00	
W. G. Anderson, on account,	25.00	
E. Hitchcock, Jr., postage,	10.00	
Balance on hand,	49.86	
		$315.00

Balance in the treasury, nothing.

Brooklyn, N. Y., April 7, 1892.

American Association for the Advancement of Physical Education,

Dr.

To William G. Anderson, M.D., Treasurer.

To cash advanced, for postage, mailing of dues and proceedings, 1889, 1890, and to April 1, 1891,	$54.16
Cash advanced mailing dues April 1, 1891, to April 1, 1892,	24.00
Cash advanced for mailing proceedings, 1891, 1892,	11.70
Envelopes, 4,200 at $2.50 per M, 1889 to 1892,	10.50
	$90.36

Cr.

By cash on account, March 1, 1892,	25.00
	$65.36

April 8, drew on the treasury for	$49.86
Dues since received for last year,	3.00
Balance still due me,	12.50
	$65.36

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